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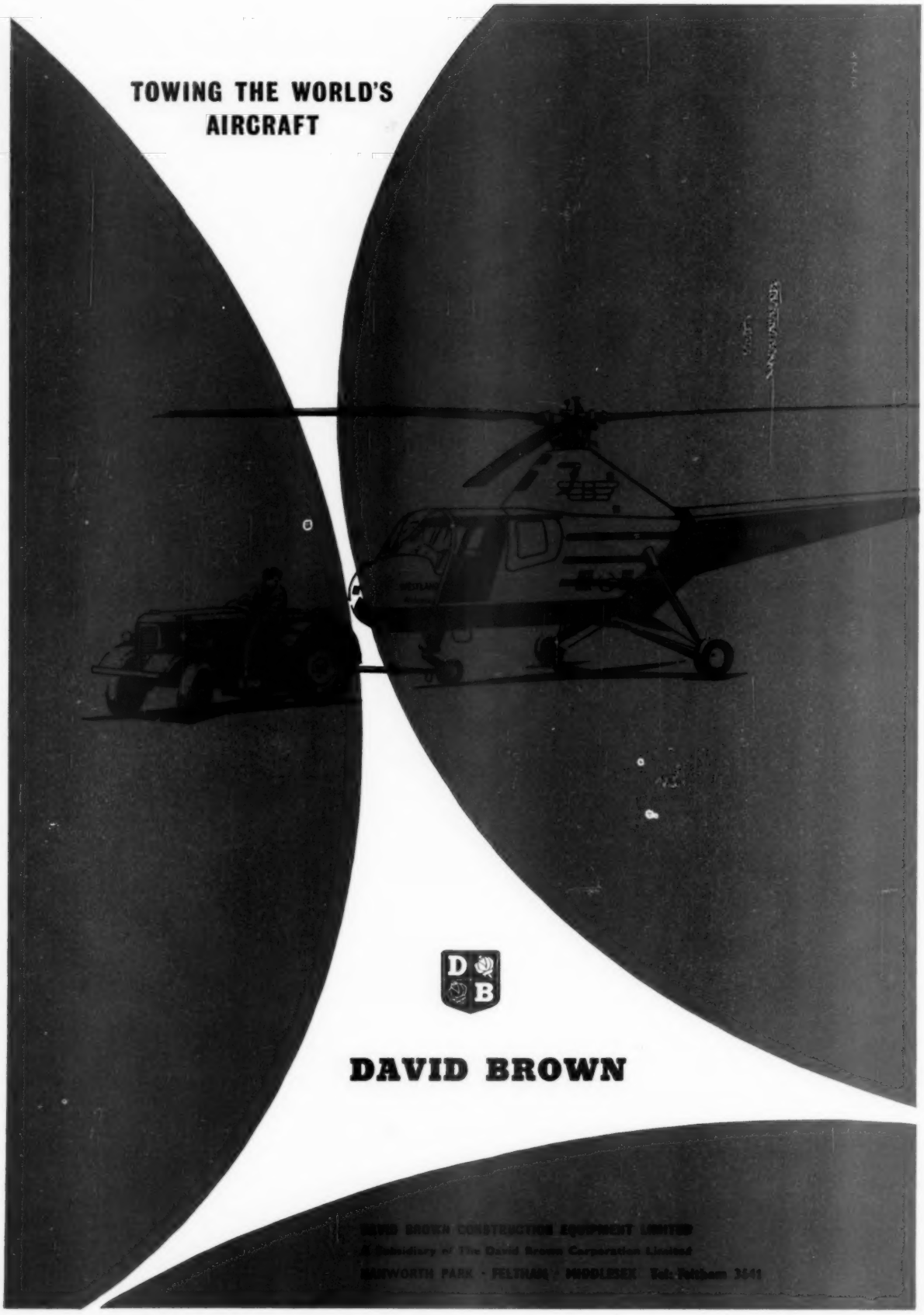

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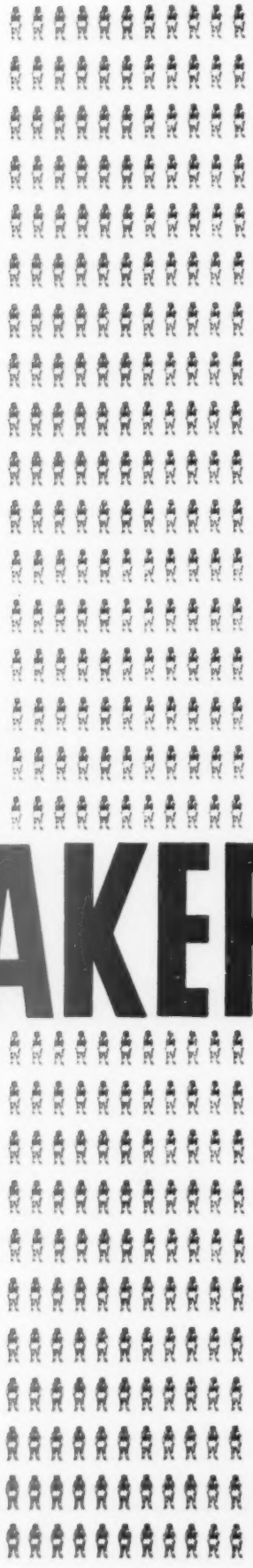

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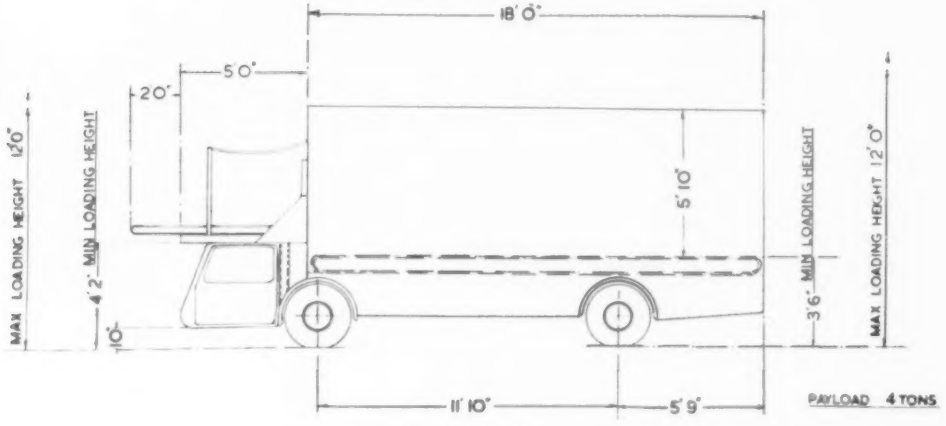

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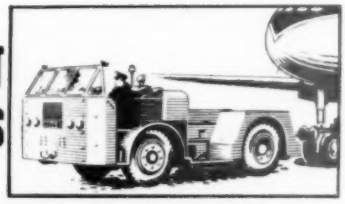

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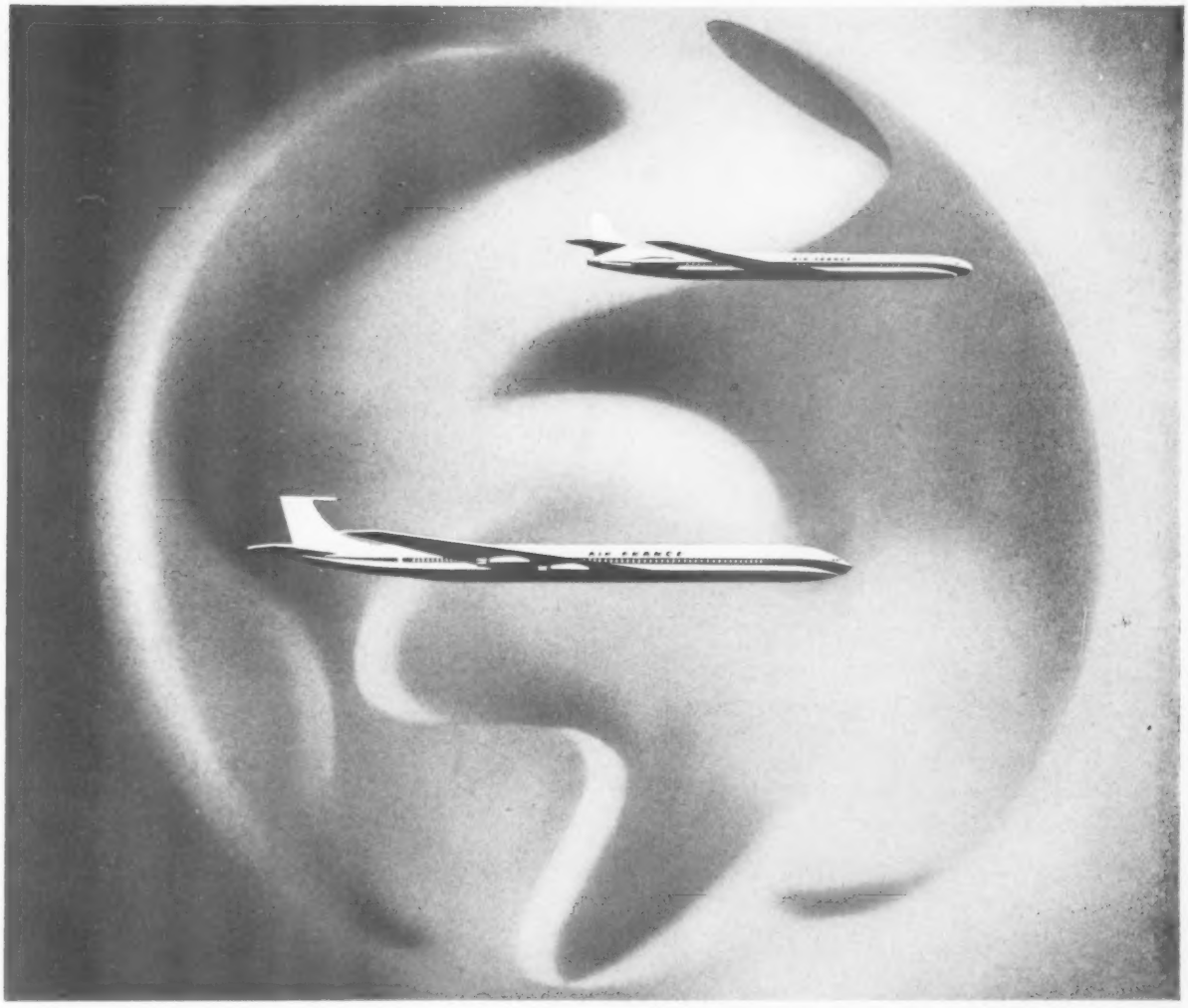

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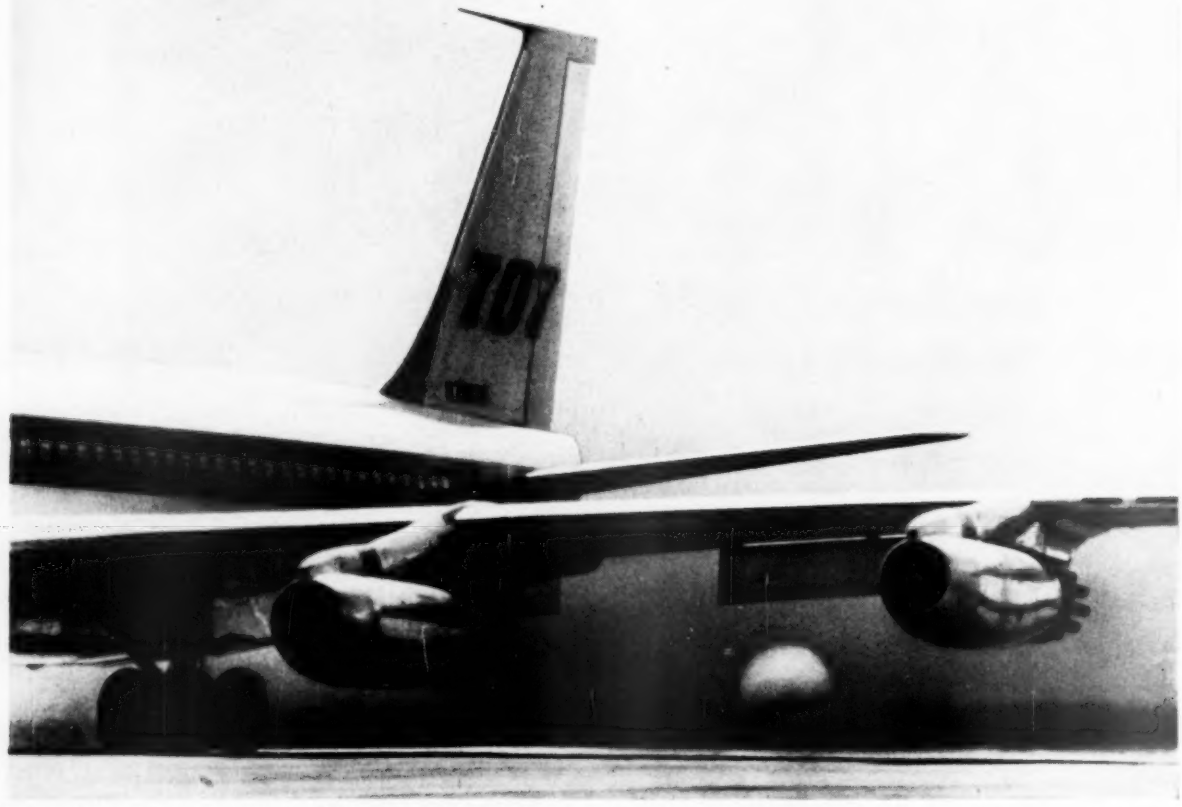

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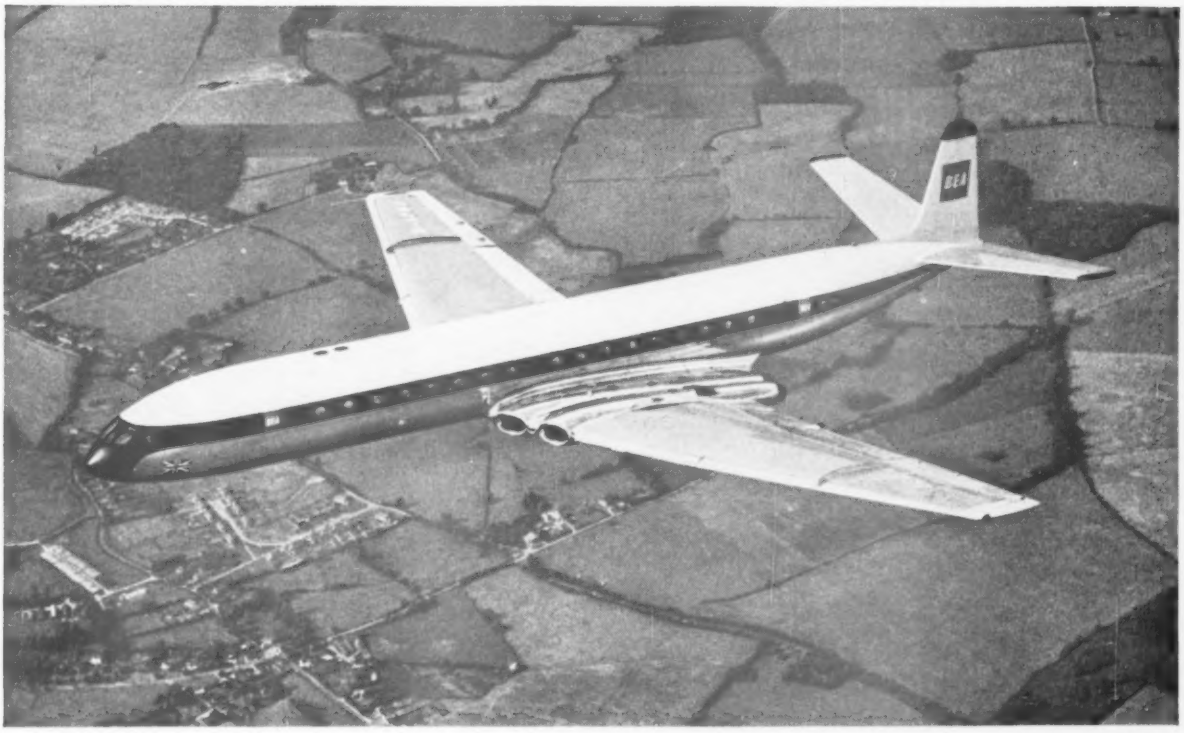

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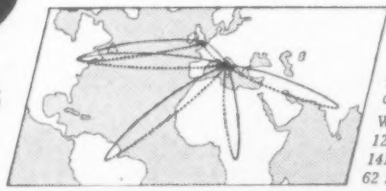

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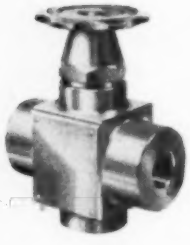

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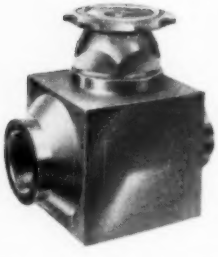

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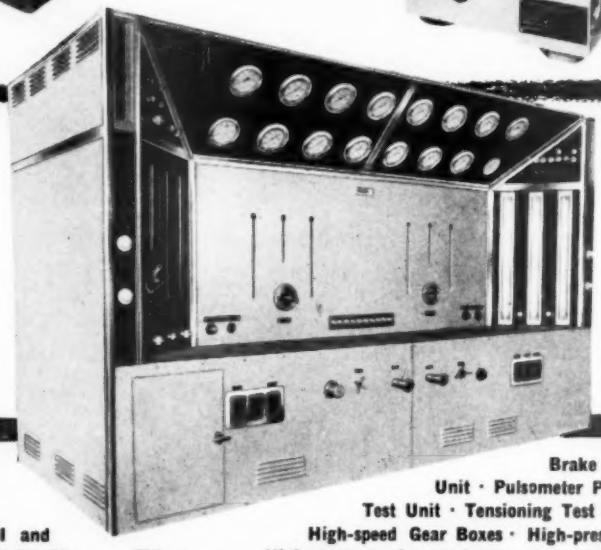

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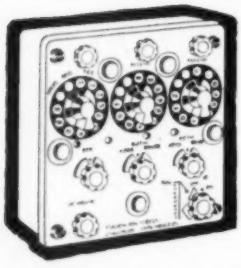

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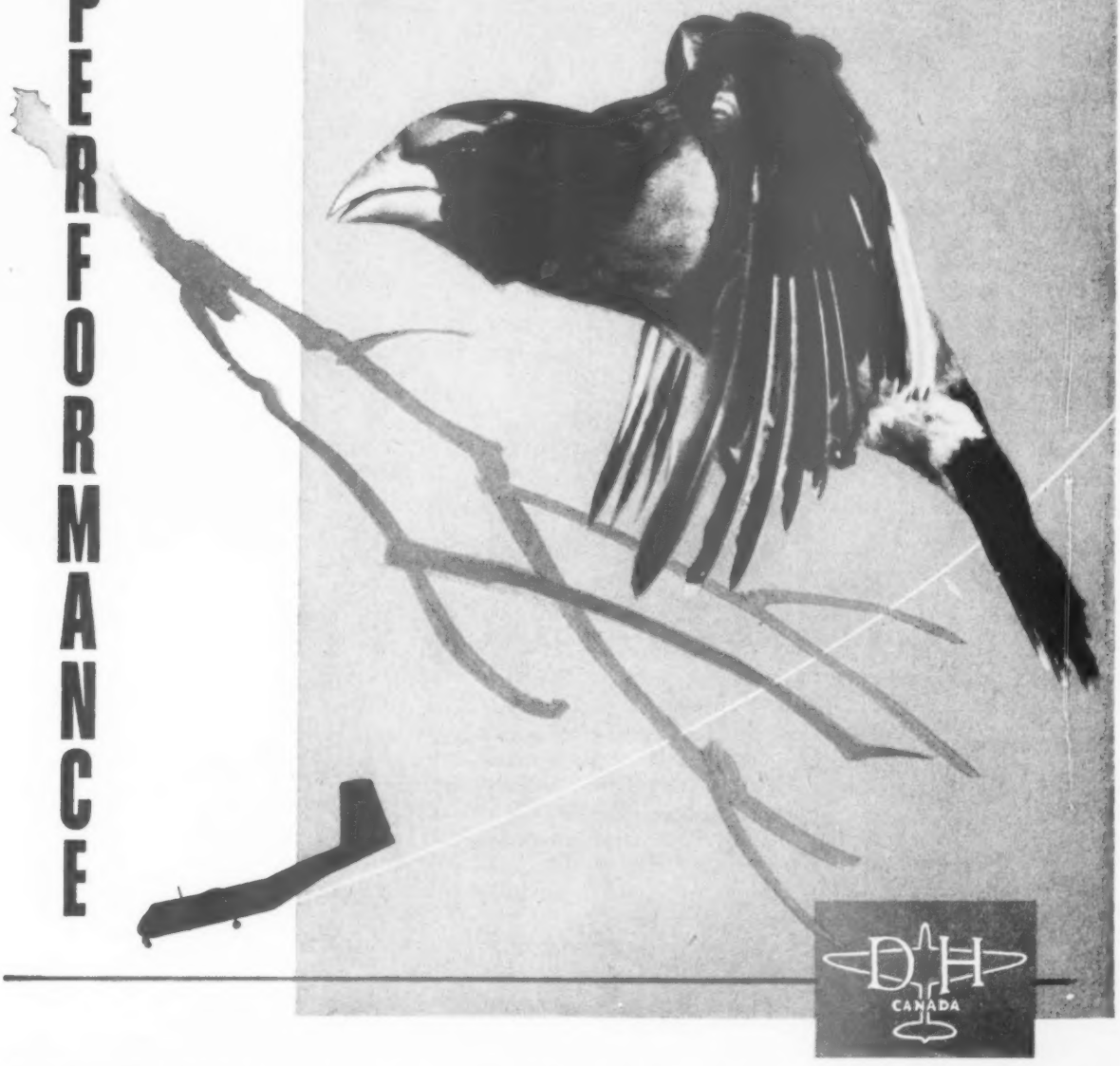

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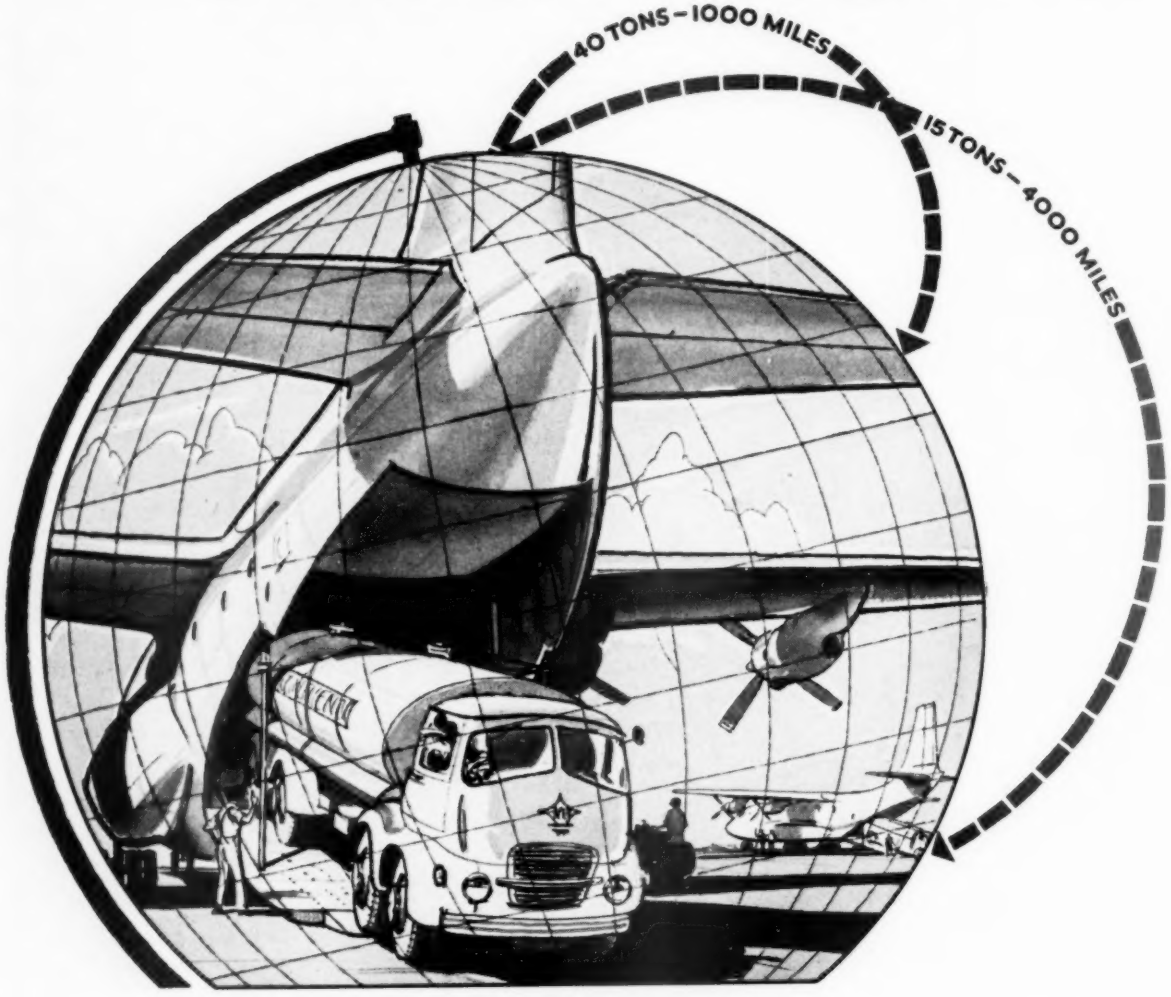

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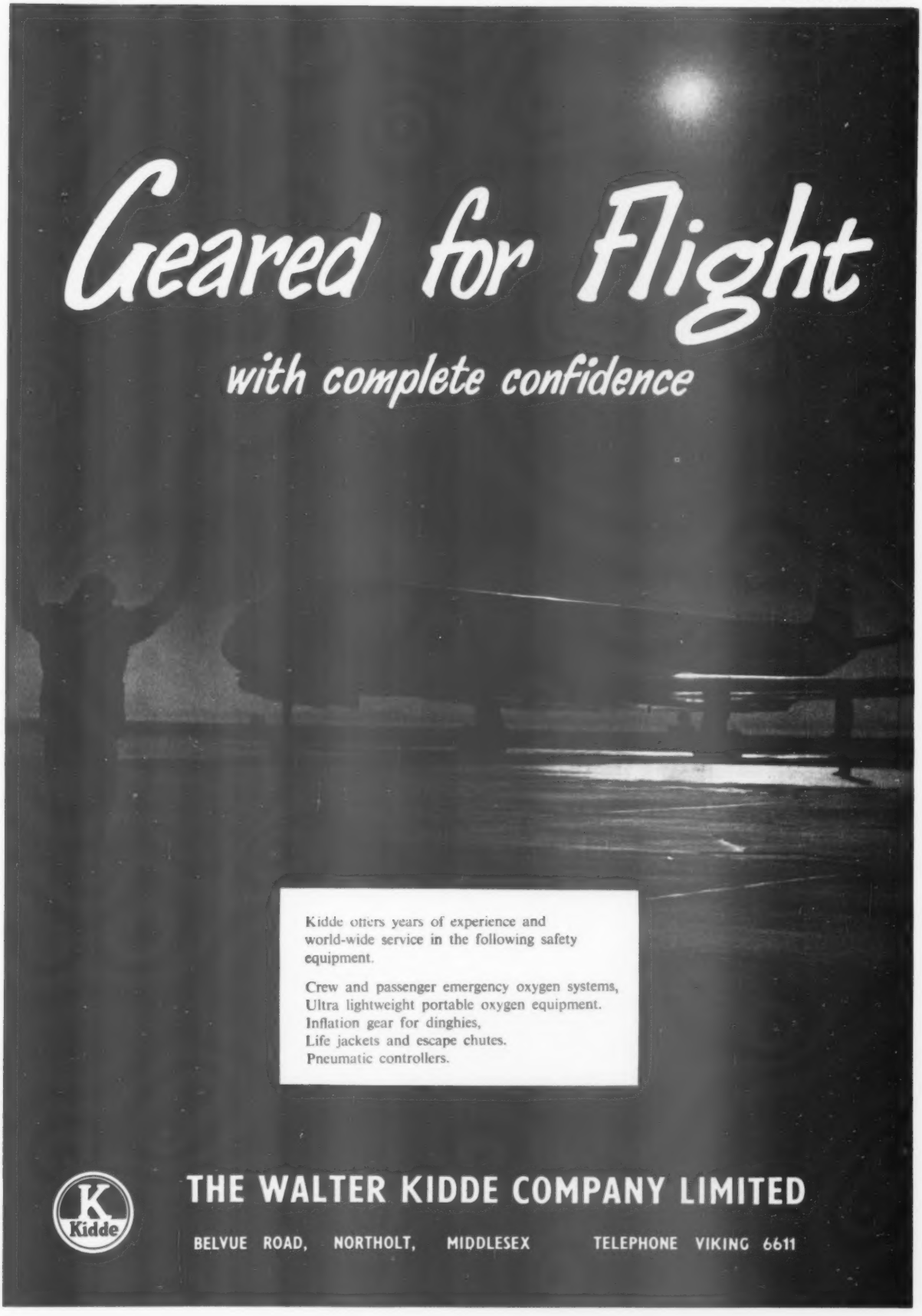
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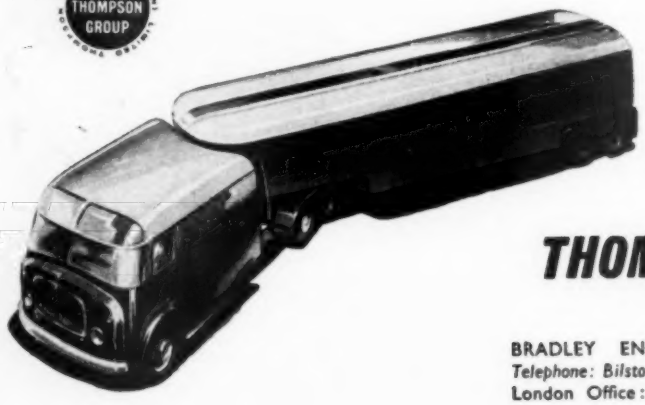

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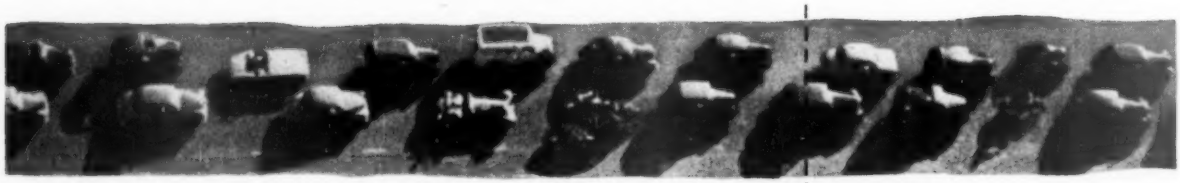

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THE AEROPLANE and ASTRONAUTICS

VOLUME 97 NUMBER 2508 NOVEMBER 13, 1959

After You, Mr. Watkinson!

Everybody in British aviation has something to say about Mr. Sandys, which is understandable. The new Minister of Aviation is steadily informing himself about the Industry and at the same time informing the Industry of his views. The fact that further concentration is still regarded as essential is bound to provide material for discussion, if not recrimination.

In contrast, nothing is heard about Mr. Watkinson. The former Minister of Transport and Civil Aviation, faced in his former post with a multitude of problems, decided that it was no good half-heartedly nibbling at the whole bunch of cherries. He boldly decided that the country's primary need in the transport business was a vigorous assault on the roads. The great new motorway between London and Birmingham shows what a forceful character can do by concentration of effort. The fact that Mr. Watkinson was not to be persuaded of the needs of the privately operated section of British aviation must blind none of us to what he is capable of getting done.

In our view the vital field of interest for all in British aviation at the moment concerns the decisions that the new Minister of Defence is going to reach regarding the aeronautical needs of the Fighting Services. The new Ministry of Aviation may have responsibility for the national airline corporations and the interests of the independent operators, but the traditional customers put their requirements up through the Ministry of Defence.

In the present international situation the new Minister of Defence has got to see that a lot of thinking is revised. The recent repayment of the British debt to the United States served to emphasize the changing positions on each side of the Atlantic. In Europe increasing self-help is the order of the day. This, coupled with the emergence of the Common Market linking France, Western Germany, Italy and the three Benelux countries, Belgium, the Netherlands and Luxembourg, grouped into a tight economic unit, must affect the supply of equipment to NATO. The fact that Britain now finds herself outside this market, but linked to the three Scandinavian countries, and Austria, Switzerland and Portugal, adds a further complexity.

By next February Britain's defence policy will have to be rethought with all these matters in mind. And as the customer is always right it seems to us that Mr. Sandys will have to wait on Mr. Watkinson.

Reorganization in Air Transport

Most appositely this issue, devoted to our annual survey of All the World's Airlines, contains a summary of the report of the Association of the British Independent Air Transport Operators. This demonstrates, as is evident, that further progress is not to be expected until there is some new thinking about the position of the independents versus the national corporations. There are, of course, a variety of solutions being canvassed. Enthusiastic proponents of B.E.A. argue that much would be gained if the rationalization of the Aircraft Industry were to be extended to include the merging of B.O.A.C. with B.E.A. Another proposal likely to appeal to one section of the air community is that the field of B.O.A.C.'s operations should be divided up and one sector made available to independent operators. A vigorously argued case is for freeing the African sector. Many will feel that this would indeed be hard on the chosen instrument which opened up the overland route to South Africa!

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Matters of Moment

Coastal Command to Remain

IN a written reply to a Parliamentary question last week, Mr. Watkinson, Minister of Defence, confirmed that there was to be no change in the status of R.A.F. Coastal Command. Following a full review of the present arrangements, it had been decided that the shore-based maritime air forces would continue to form part of the R.A.F., and Coastal Command would continue as a separate Command.

The Minister also stated that in maritime exercises or operations, the senior naval commander in each area, at home and overseas, would decide the operational tasks on which shore-based maritime aircraft were to be employed and would give the necessary orders to the senior maritime air force commander in the area concerned. This statement does not involve any material change to the inter-Service arrangements which have been in force for a number of years.

Blackburn Executive Changes

LAST week, we briefly recorded the forthcoming resignation, on January 1, of Mr. Eric Turner from his posts as chairman and managing director of the Blackburn Group, in order to join the Birmingham Small Arms Co. at the beginning of next year. He is to become B.S.A.'s deputy chairman and chief executive.

In the announcement of this important change in their affairs, the Blackburn Group paid tribute to Mr. Turner's efforts during the past few years, referring to his "conspicuous service in building up the Group to its present position." He will, it was stated, retain his seat on the Blackburn board and continue to give "all possible assistance" in its affairs. He has been with Blackburn since 1946, when he joined the company as chief accountant. He became secretary in 1948 and joined the board in 1950.

Mr. A. F. Jopling (above), who succeeds Mr. Turner as chairman of the Blackburn Group, is also an accountant and joined Blackburn in 1936. He was born in 1905 and was articled to a firm of chartered accountants in Middlesbrough. After qualifying in 1927 he joined Peat, Marwick and Mitchell with whom he stayed for eight years before becoming Blackburn Aircraft's chief accountant in 1936.

In 1941 he was appointed secretary to the company and in 1946 appointed to the board. Two years later he left Blackburn Aircraft and until 1957 when he rejoined the company—by that time, Blackburn and General Aircraft—he held a number of important posts; for example, he became executive chairman of the Lawley Group (a position he still holds) and in 1948 joined the board of Miles Aircraft.

Soon after returning to Blackburn Mr. Jopling was made a director of Blackburn (Dumbarton), Ltd., and of Thomas Green and Son. In April, 1959, he became chairman of Blackburn Electronics, Ltd., and in May the same year chairman of Blackburn (Dumbarton), Ltd.

Following Mr. Turner's resignation as Group managing director, Mr. N. E. Rowe and Capt. E. D. G. Lewin will become joint managing directors of the Group's principal subsidiary, Blackburn Aircraft, Ltd.

Atlas Operational

ALMOST unnoticed, the U.S.A.F. has put on the basis of instant readiness the first of its intercontinental ballistic missiles. The first operational ICBM pads are located at Vandenberg Air Force Base, California. Equipped with Atlas missiles, the ICBM squadron consists of 500 men who maintain a 24-hour duty roster, with 28 men in the blockhouse at all times.

To get an Atlas into the air operationally, the "alert" signal is first communicated by direct telephone line from the Strategic Air Command headquarters in Omaha, Nebraska; this starts the fuelling operation. Within 15 minutes the missile should be ready to fire. Targets are preselected, but actual launching cannot be made until President Eisenhower himself gives the order. Even then, it is said, an explosive charge can destroy the missile in flight.

It will, however, be some time before S.A.C.'s bombers are overshadowed by ICBMs as the nation's principal "deterrent" force. Only three Atlas pads are so far operational at

SALES TOUR.—At Hatfield before starting its German sales visit is the D.H. Canada STOL Caribou transport. On the left, in front of the rear loading ramp, are three engineers with Mr. R. Blythe (de Havilland), then Mr. Russ Bannoch, D.H. Canada operation's director and the two pilots, Messrs. David Fairbanks and M. Saunders.

Photographs copyright "The Aeroplane and Astronautics"

Helicopter I.o.W. Ferry

PLANS are in hand to link Ryde, Shanklin and Newport on the Isle of Wight with Portsmouth and Southampton on the mainland by helicopter. Single fares of £1 per stage are envisaged. Permission to operate is being sought by Executair. On November 7 Capt. John Crewdson in an Executair Widgeon carried the Lord Mayor of Portsmouth, Councillor L. J. Evans and the Mayor of Southampton, Alderman Mrs. R. M. Stonehouse to Newport where they were welcomed by the Mayor of Newport, Alderman A. O. Purdy, and the chairman of the I.o.W. County Council, Alderman Capt. H. J. Ward. Many other crossings were made in the course of a day.

These "AEROPLANE" pictures show the War Memorial on Southsea Common and the field at Newport whence flights were made last Saturday. For regular services Southampton rotor port is to be on scheduled site at junction of Southern Road and West Bay Road. Site at Portsmouth has yet to be agreed. The other two pictures were taken en route.

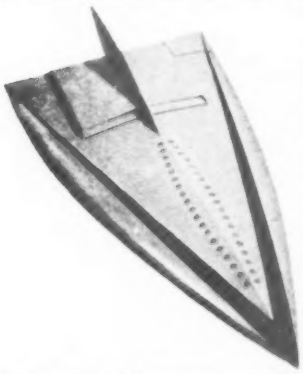
We understand that the intention is to open the service with one Whirlwind. It will surely be politic in view of the continuous water-crossings involved to plan for the early introduction of twin-engined craft.

Vandenberg, with six more under construction. Six further Atlas launching sites, and five for Titan, are being built elsewhere in the United States. But even when all these are ready—and Minuteman has been added to the ballistic "armoury"—it is still felt in Washington that the manned bomber will have a part to play.

Supersonic Airliner Research

A WING with a drooped leading edge is likely to be tested on the Fairey Delta F.D.2, the aircraft which won the World airspeed record in March, 1956. Supersonic flight tests with this new wing form will provide valuable information for the design of a British supersonic airliner. The Handley Page 115 research aircraft, now under construction, will give information on the low-speed characteristics of slim-delta aircraft, doubtless as part of the same research programme.

The accompanying illustration shows an R.A.E. model of a possible supersonic airliner; its drooped leading edge is a characteristic feature. It could well be that this is the type of leading edge that will be tested on the F.D.2 and the H.P.115.



This research programme has grown out of the work of the Supersonic Transport Aircraft Committee, a body whose work has been shrouded in secrecy since its existence leaked out early in 1957. Presumably this has been imposed as a matter of commercial security on a national scale—for how otherwise could such secrecy about a civil research programme be justified? But decisions involving the British taxpayer in the expenditure of £100 million or more on a supersonic airliner may soon be made as a result of S.T.A.C. studies and it is high time that a little more was revealed of these activities.

Occasionally, the veil on S.T.A.C. work is lifted slightly—as, for example, in a recent issue of the *R.A.E. News* where the research programme was discussed. According to this, towards the end of 1955 theoretical and experimental work had shown that the area-rule technique might lead to efficient transports operating at Mach 1.2. The Director of the R.A.E. suggested that the aircraft industry, the airlines, and the research establishments might co-operate on the necessary research. As a result the S.T.A.C. was formed in November, 1956, and set up a technical sub-committee to supervise the programme and a range of specialist groups to study various aspects of the problem.

From the start configurations suitable for Mach-2 operation were also studied. Although higher speeds are technically feasible—and indeed appear to be favoured in the U.S.—it was decided to concentrate on Mach 1.2 and 2 aircraft because higher speeds might demand steel structures, which would require a prolonged development period.

By mid-1957 the programme was well under way, with the work being shared by nine aircraft companies, four engine companies, the Aircraft Research Association, B.O.A.C., B.E.A., the A.R.B., the N.P.L., N.G.T.E., the R.A.E., M.T.C.A. and M.o.S. headquarters. The groups set up included ones responsible for high- and low-speed aerodynamics, structures, engines, air intakes, and operational problems.

By early 1959 enough results had been produced for the S.T.A.C. to present a formal report suggesting that design work should begin. The main committee has now wound up its activities, but the technical sub-committee and the specialist groups will continue to operate until the experimental programme has been completed.

Mr. Aubrey Jones, then Minister of Supply, announced last July that the S.T.A.C. report had been referred to the aircraft industry for its views and that the industry favoured development of only the long-range Mach-2 airliner. The decision on whether to go ahead with either project—and which current or future grouping of companies should be responsible—now lies with Mr. Duncan Sandys, the new Minister of Aviation. And in any event, competing proposals for faster variants are now being put forward within the industry.

Mexican Merchants

DUNCAN Y COSSIO S.A. de C.V. of Mexico City have been appointed exclusive sales agents in the Republic of Mexico by Hawker Siddeley Aviation, Ltd., to be responsible for the sale of the civil projects of the group, notably the Avro 748 and the A.W. Argosy, in both of which aircraft Mexican operators have shown positive interest.

Founded a few years back by Alex Duncan in partnership with Miguel Cossio, Duncan y Cossio is an Anglo-Mexican enterprise representing British interests in Mexico in the fields of aviation, marine and general engineering. The company also represents Redifon, Ltd., Cossor Radar and Electronics, Ltd., Slingsby Sailplanes, Ltd., Aircraft Exchange of London and New York, and are the correspondents for Fairey Aviation, Ltd.

The original sale of Bristol Britannias which broke the ice for British aircraft in this progressive and discriminating market being now followed by the purchase of Comet 4s (also for Mexico's external services) should keep the bed suitably warm for new British types now emerging—which can cope with Mexico's often critical internal operating conditions—such as the Series II Avro 748 with Rolls-Royce Dart 7s.

Matters of Moment . . . .

Open Day at A.R.D.E.

ALTHOUGH primarily charged with the wider task of doing research, design and development for weapons and ammunition for all three Services, the Armament Research and Development Establishment at Fort Halstead near Sevenoaks, is of particular aeronautical interest in that it is now concerned, too, with certain aspects of guided missile technology. Principally this work is connected with surface-to-surface weapons such as anti-tank missiles and tactical support weapons such as Corporal.

In all its various activities, the Establishment is responsible for a good deal of fundamental research, both of the purely theoretical and the experimental sort. For aerodynamic investigation, it is particularly well equipped, and at Fort Halstead one finds a hypersonic tunnel for projectile research which is capable of speeds of the order of 10,000 m.p.h.; and a low-density wind-tunnel that can simulate conditions equivalent to 15,000 m.p.h. in a rarified atmosphere.

Neither of these pieces of equipment have any "rivals" in this country, although at the National Physical Laboratory at Teddington there is similar apparatus capable of hypersonic speeds. The hypersonic tunnel at Fort Halstead is a form of the now familiar shock tube but is of an advanced type capable of providing the hypersonic flow at a very high temperature.

This is accomplished by having a copper/nylon piston in the upstream, or high-pressure, end of the main tube and a diaphragm just forward of the throat ahead of the 3-in. working section. With the diaphragm intact and the piston travelling down the tube at supersonic speed, repeated shock waves and rapid compression raise the temperature.

When the diaphragm is released this high-temperature air expands through the nozzle into the evacuated working section. This gives a flow at speeds of the order of Mach 20 and, depending on the conditions, lasting between 1/10 and 1/20 sec.; provision is made for measuring the forces on the model in this time. Using the highest possible pressure ratio available between the upstream pressure bottle and the downstream evacuation chamber, the maximum temperature that can be attained is 4,000° C; the "working" gas is helium.

A.R.D.E.'s low-pressure tunnel is also of considerable interest to the aeronautical engineer—or, perhaps, more correctly to the astronautical engineer. In this, gas at a low pressure is heated using electric discharge techniques, to about 10,000° C., so that it becomes ionized. It is then expanded through a hypersonic nozzle into an evacuated working section. Possible tasks for this useful piece of apparatus that come immediately to mind are the study of re-entry and heat transfer problems on satellites.

FORT HALSTEAD INSPECTION.—Looking at a missile demonstration at A.R.D.E. on November 3 are, left to right: Gp. Capt. J. McQ. Fitch; Capt. E. R. C. Morris, R.N.; Dr. D. H. Black, Director of A.R.D.E.; Mr. E. W. Chivers, Deputy Director; and Brig. R. H. Farrant.

These two tunnels were on show recently when the A.R.D.E. held "open house" for a large number of invited guests from industry and the Services. For three days last week many of the Establishment's activities that are not Security bound were enthusiastically demonstrated and explained by the staff.

In many sections of the Establishment some of its work concerning guided missiles was to be seen. This included a general display, dominated by a Corporal, of missile components and systems developed at Fort Halstead; among them was a pneumatic servo system for control surface actuation and embodying a very neat little vane motor.

Equipment developed for the arming and safety mechanisms of guided missiles was shown in the fuze section, and in other departments in the Establishment there were various electronic devices on show. One of these was a range timing system for measuring the speed of short-distance anti-tank missiles.

A particularly interesting section was one in which was demonstrated an electronic simulator for investigating the remote control systems of the command-guidance type used in the smaller missiles. By feeding the appropriate equations of motion into its computers, this simulator can be applied to the whole range of weapons of this type.

Antipodean Wroundabout

En Wroute. After a smooth journey out here in four days by B.O.A.C. Britannia and T.E.A.L. DC-6, I do not look back in hunger. Champagne, calories and proteins in abundance. With the usual Wren luck my fellow-traveller as far as Singapore was an ex-Ford Trimotor pilot, Mr. E. W. Hazzard, naturally nicknamed "Hap." Now Chrysler's Far East manager, he reminisced aeronautically and happily. One early days' story: When he took an aunt up for her first flight she heard him tell the mechanic that the fuel in the tank should be sufficient for their short flight. "Well," she chipped in, "just as long as you've got enough to get us down."

"HAP" HAZZARD

The Hotel Britannia's sky-bar sponsored a unique wrecord. Already the Only Man to be Stung by a Wasp at Forty Thousand Feet (in a Comet), I now claim to be the First Man to have a Cocktail Stick Impaled in the Foot at Twenty Thousand Feet over the Equator. There it was in a slice of lemon on the floor, and like most of the others, I'd kicked off my shoes for comfort. Then that fatal foot movement. "Steward! Antiseptic! Bandages! Force brandy down my throat!"

*

At a wet **Sydney** airport Qantas were having a little 707 trouble and I was told, although I didn't really believe it, that they are contemplating making a film called "Around The World in Eighty Delays."

A certain airliner in these parts has earned for itself the nickname of "Our Feathered Friend." You name it.

Over to T.E.A.L. at Sydney, where one is exposed to some doubtful P.R.-manship, if you like to see it that way. Before embarking on the 1,300-mile voyage across the tempestuous Tasman, each passenger is given a Tiki, a little green Maori mascot. It is described on its envelope as "a lucky charm." However, Capt. White in his Tiki-less cockpit provided a care-free crossing, thus proving something or other.

*

Although the forms on the **London-Christchurch** run seem to be less numerous than when I last did the trip, I still think the best business to be in is not airlines but printing.

In "more-British-than-the-British" New Zealand, there was righteous indignation over the "Sorry—no Comets" deal. T.E.A.L., in fact, was being interpreted as "Take Electras And Like it."

For the first time that I can remember, a flying display's printed programme has included a picture of an aeroplane which has yet to fly. In the Wellington Airport inaugural display programme, there was, among the pictures of Vampires, Voodoos and Vulcans—the Avro 748. To Hawker Siddeley's N.Z. rep.—Well done, that man!

*

General Aviation News

AERIAL JEEP.—This VZ-7AP "flying platform" has been produced by the Aerophysics division of Curtiss-Wright for the U.S. Army. Its four rotors are driven by an Artouste 2B shaft turbine developing 425 s.h.p. for take-off.

FRENCH FLIGHT HOURS.—Of the 66,682 hours flown by *l'Armée de l'Air* in August, 16,300 were accounted for by Algerian operations. Transport aircraft flew 7,700 hours, and helicopter squadrons achieved nearly 5,000 hours. Some 10,500 hours were flown on training.

LONG-RANGE STRIKES. — North American F-100 Super Sabres of the French Air Force fighter-bomber wing at Rheims-Champagne airfield are flying non-stop from there with external fuel tanks on low-level operations against rebel forces in Algeria. The F-100s then fly back to Istres, near Marseilles, to refuel before their return to base. The en route cruises are flown supersonically.

IRBM PROGRAMME.—The U.S.A.F. Thor programme has been cut by about £35 million because Britain is the only European country to deploy this missile. There are four Thor squadrons in Britain, each with 15 missiles; a fifth squadron has been cancelled. Two Jupiter IkBM squadrons are to be based in Italy and a third in Turkey.

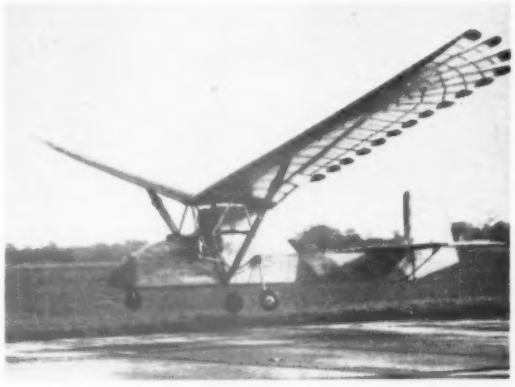
CANADIAN HELICOPTER. — The Sikorsky HR3S-1 transport helicopter has been ordered for military use in Canada; much of the aircraft will be produced by Canadian Pratt & Whitney. The commercial version of this helicopter is the S-61. Powered by two 1,250-h.p. General Electric T58 turbine engines, the HR3S-1 has an amphibious hull, retractable landing gear and all-weather flight capability.

AIR-LAUNCHED SATELLITE.—On November 4 it was confirmed that last year the U.S. Navy tried unsuccessfully to place a small satellite in orbit by means of an air-launched solid-propellent rocket. An F4D jet-fighter is believed to have been used in the experiment, but the Navy has now announced it has no further plans for air-launching Earth-satellites.

PARIS IN SERVICE.—The Morane-Saulnier M.S.760 Paris is now in service with *l'Armée de l'Air* at Villacoublay. Eight equip the 60th Escadre de Transport et de Liaisons.

NO DISCOVERY.—The U.S. Air Force gave up an attempt to recover a 300-lb. capsule which should have been ejected from the satellite Discoverer VII, launched on November 7. Although a satisfactory orbit was achieved (perigee 104 miles, apogee 550 miles, period 95 minutes), the satellite apparently failed to stabilize and the capsule did not eject as planned on the 17th orbit.

EXPORTS.—Aviation exports for the first nine months of 1959 were £121,294,252, 7% up on those for the same period last year. Since the War the aircraft industry has earned £907 million, about 55% of this total since January, 1957.



In this close-up of the Hartman ornithopter the lift loads are being carried by the elastic cords, the steel check-wire being conspicuously loose. Mr. Hartman's recent landing on a wing-tip demonstrated that even an ornithopter needs lateral control.

News About People

A. Delobelle, winner of the Mollison Trophy.

CHELSEA PRIZEGIVING. — Mr. Donald Campbell, C.B.E., presented the Trophies and Diplomas at the Chelsea College of Aeronautical and Automobile Engineering on November 2. A. Delobelle received the Mollison Challenge Trophy; T. Neocleous, the Olley Challenge Trophy; and P. N. Rolle, the Nelson Memorial Prize. Eighteen students received diplomas in the Department of Aeronautical Engineering.

P.P.S. TO M. OF AV.—Mr. Duncan Sandys, the Minister of Aviation, has appointed Mr. Richard Hornby, M.P. for Tonbridge, to be his Parliamentary Private Secretary in succession to Mr. Geoffrey Rippon, who has become a Junior Minister.

CIVIL ATTACHE.—Mr. J. L. Roberts has been appointed Civil Air Attaché, Bonn, in succession to Mr. J. Banfield.

C.P.A. APPOINTMENTS.—As part of a general integration of C.P.A. services in Europe, Mr. T. G. Hughes has been appointed European passenger manager. With his assistant, Mr. R. J. Harden, he has his headquarters in London. Mr. J. F. G. Swan has become regional traffic manager (air), and Mr. J. A. M. Watson regional sales manager (air).

PRODUCTION MANAGER.—Mr. I. W. Readman has been appointed production manager at the Birmingham factory of the Triplex Safety Glass Co., Ltd. Mr. Readman will be responsible for all aspects of production of glass panels for civil and military aircraft.

I.C.I. METALS DIVISION.—Mr. M. J. S. Clapham has been appointed chairman of I.C.I. Metals Division from January 1, 1960, in succession to Dr. Maurice Cook, C.B.E., who retires from the company's service on December 31, 1959. Mr. Clapham has been joint managing director of the division since October, 1952.

Left to right, G. C. I. Gardiner; G. H. F. Brown; T. W. Air; C. C. Williams and Dr. G. H. Hough.

HAMBLE APPOINTMENT. — Mr. A. E. H. Masters, who has been director of the M.o.S. Fighting Vehicles Research and Development Establishment since 1945, will become managing director of Petters and of Hawker Siddeley (Hamble) on January 1. He will also be a director of Hawker Siddeley Industries.

LUFTHANSA APPOINTMENTS.—The board of Lufthansa, comprising H. M. Bongers and Dipl. Ing. Gerhard Höltzer, has been strengthened by the appointment of two deputy members—Wolfgang Kittel, former district manager for North and Central America, and Dipl. Ing. Hans Süssenguth, former traffic manager.

M.E.A. IN LONDON.—Mr. Henry K. Noun has been appointed sales manager (U.K.) for Middle East Airlines, and has taken charge of the London office at 69 Piccadilly, W.1. He succeeds Mr. Fuad Sidrassi, who has been appointed sales manager (India) in Bombay.

NEW CONSULTANTS. — Capt. A. B. H. Youell and Mr. L. de Loriol have formed a small company—Helicopter Consultants, Ltd., of 180 Brompton Road, London, S.W.3; it was founded mainly as an agency for the Omega helicopter. Capt. Youell has 12 years of helicopter operating experience and is well qualified to advise anyone who wishes to enter this growing industry.

HATFIELD CHANGES.—de Havilland Propellers, Ltd., has reorganized its engineering division. Mr. G. C. I. Gardiner has been appointed chief executive of ballistic missile engineering, relinquishes his position as chief engineer, but remains as technical director. Mr. T. W. Air is appointed chief engineer of ballistic missiles; Mr. G. H. F. Brown is appointed chief engineer (propellers, aircraft and industrial equipment); Dr. G. H. Hough becomes chief engineer (air-to-air guided weapons); Mr. C. C. Williams is appointed general manager of the company's ballistic missile organization. This reorganization groups the company's activities into separate product divisions, each under its own engineering leader responsible to the managing director.

ALEC DUDLEY PAGE.—We regret to record the sudden death of Wg. Cdr. A. D. ("Bats") Page. A memorial service will be held on Thursday, November 19, at Christ Church, Down Street, at 11.30 a.m.

T.P. APPOINTMENT.—Mr. H. O. S. Bridcutt has been appointed advertisement manager of Temple Press Limited. Joining the company in 1949 from industry he became advertisement manager of *The Motor* in 1950 and deputy advertisement manager of the company in 1957.

Commercial Aviation Affairs

ANOTHER VISCOUNT.—Philippine Air Lines has ordered a third Viscount, for delivery in December. It is the last of the 15 V.745s originally built for Capital Airlines. Viscount sales now total 408; the last, for Misrair, will be delivered early next year.

CL-44 ORDER.—Slick Airways is likely to buy at least two Canadair CL-44D freighters in place of the six Lockheed Super Hercules, the order for which was subject to a military development contract by September. Firm orders for the CL-44 total 27, including 12 for the R.C.A.F., not 10 as shown in our issue for October 16.

S.A.S. CORONADOS.—Scandinavian Airlines System has ordered two Convair 600 Coronados for delivery in 1961, in addition to two which S.A.S. will lease from Swissair.

ORDER CANCELLED. — Riddle Airlines has cancelled its provisional order for four Armstrong Whitworth Argosies, as an economy move. Mr. Robert M. Hewitt, recently elected president in succession to Mr. George Giles, has been reported as saying that Riddle was unable to produce a cash deposit as stipulated in its letter of intent.

MANSTON EXPANSION. — Silver City Airways now operates all five Manston-based Hermes in its Southern Passenger Division. Since last June, two Hermes have been used by Silver City on the rail-air-rail service to Paris, and three have been in Britavia colours. Mr. R. M. Hackney has moved to Manston, as base manager, from his position as operations manager of the passenger division at Ferryfield, and Mr. J. R. Dixon has been appointed operations superintendent.

JT-3 OVERHAULS.—Continental Air Lines, which has been achieving better than 11 hours daily utilization of its Boeing 707s, has been authorized to run its JT-3C turbojets for 1,000 hours between overhauls—the longest period approved for any airline using the JT-3C.

CARAVELLE PROGRAMME.—Sud Aviation will change from Caravelle I to Caravelle III (11,400 lb. s.t. Avon 527 engines) with the 35th aircraft on the production line. Conversion of Avon 522As to Avon 527s will be possible by changing the fixed position nozzle for a two-position nozzle. Avon 522As will be introduced on the 21st Caravelle (the first for Finnair), while the 19th Caravelle will be used for certification trials of the Caravelle III, starting this month and scheduled for completion by March, 1960.

JET PARKS AT L.A.P.—Work has started on construction of additional hard-standings for jet aircraft, a road, compass base and taxiway in the north-eastern area of London Airport. The £340,000 contract was awarded to Taylor Woodrow Construction, Ltd.

SABENA 707 FINANCE.—Of the total $36m. for Sabena's five Boeing 707s, $20m. will be provided by the U.S. Export-Import Bank and seven U.S. commercial banks. Boeing and United Aircraft will provide credits of $2m. and Sabena will pay the remainder in cash. The Belgian Government is guaranteeing the bank credits, repayable over seven years.

INDEPENDENT COMMITTEE.—A committee to represent aircraft operators in dealings with the M.o.A. and other official bodies was set up at a recent meeting, principally of non-members of BIATA. Mr. Eric S. Hanks, chairman of Tradair, was elected chairman of the committee, and two other members are to be appointed.

OLYMPIC ACCIDENT.—A Dakota of Olympic Airways on a flight from Athens to Salonika crashed soon after take-off on October 29. All 18 occupants were killed.

CANADAIR TRAINER.—Soon to make its first flight, the Canadair CL-41 basic Service trainer is powered by a Pratt & Whitney JT12 turbojet.

Air Transport

Precedent for a Write-off

WHATEVER may be the ethics involved in B.O.A.C.'s transfer of £6¼ million of aircraft development expenditure and aircraft sales losses to the accumulated deficit column, the critics seem to have missed one important point.

This refusal by B.O.A.C. to accept a loss for which it does not feel itself to be directly responsible has a precedent during its own comparatively recent history. In 1950-51 (when Exchequer grants were still in order) the board "considered it prudent" to make provision for the unnaturally early retirement of aircraft and a sum of £2 million was put by in a "special reserve." In the 1953-54 accounts provision was made for the estimated loss on the disposal of the Hermes fleet and associated spares. The "special reserve" was used to cover all but £68,190 of this estimated loss.

As we comment on p. 466, in the introduction to the annual Airlines of the World supplement, the fact of the loss is a symptom of the effect on one airline of rapid and fundamental re-equipment. In normal conditions the older vehicles would not have lost their value so rapidly (with more losses to come) and there should have been ample time in which to absorb development costs.

Airline Pilot Training Plans

MORE details have now been given of the plans for the new College of Air Training, Hamble (see our issue of May 15, 1959). The College will come into being on May 1, 1960, and the first intake of cadets for the two-year course will be in September. As already tentatively agreed, the cost of training will be initially shared between the sponsoring airline, the Treasury and, probably, the Ministry of Education.

The first intake at the College will consist of 50 cadets sponsored by B.O.A.C. after careful and rigid selection by that Corporation. Applications will be due at the end of this month. For 1961 B.E.A. will be ready to offer a selection of cadets and from that year onwards there is likely to be a minimum intake of 40 cadets from each Corporation and, possibly, a quota from the independent carriers.

After selection by the airlines the cadets will go for a two-year course at Hamble and this course will be followed by a period of ground and more advanced air training with the sponsoring airline. During this latter period the cadet will be on the salaried strength of the airline. Of the estimated average future training cost of £4,000, the Exchequer grant will be £1,000 and the sponsoring airline will provide the remainder —of which £1,000 will be paid back over a period by the successful pupil. Fees and maintenance costs will be of the order of £380 per annum and the local education authorities are being invited to consider cadets for suitable awards. Cadets must be born of U.K. subjects and U.K.-educated to be eligible for the grant. Applicants must be at least 18 but under 20 years of age on entering the College, or up to 23 years in the case of holders of University degrees.

The first chairman of the nine-man board of governors of the College will be Capt. J. W. G. James, O.B.E., flight operations and communications director of B.E.A., and the deputy chairman will be Capt. T. H. Farnsworth, chief of flight operations, B.O.A.C. Principal of the College will be Air Marshal Sir Hugh Walmsley, K.C.B., K.C.I.E., C.B.E., M.C., D.F.C., who has, since 1952, been managing director of Air Service Training, Hamble, which is being taken over by the College.

Air Union and Eurocontrol

THE responsible ministers for civil aviation in the governments of Belgium, France, West Germany and Italy, held a private meeting in Brussels last week to consider the Air Union proposals. The plans of Sabena, Air France, Lufthansa and Alitalia to integrate their commercial operations on April 1, 1960, as a first step towards a more complete technical co-ordination, were approved by the four ministers, who agreed to give Air Union all necessary governmental support.

This meeting followed one by Western Europe directors-general of civil aviation to consider the integrated system of air traffic control known as Eurocontrol. To this meeting, the Minister of Aviation, Mr. Duncan Sandys, addressed the following message:—

"As the former chairman of the European Movement, I am particularly happy that the plan for European air control should be one of the first issues of policy with which I have had to deal as British Minister of Aviation.

"The rapid growth of jet-propelled air services flying at immense speed and high altitude across the frontiers of Western Europe makes it urgently necessary to establish an integrated system of traffic control in the upper air space.

"The British Government is therefore very pleased to join with the Governments of its European neighbours in studying the problems involved, with a view to setting up an effective common organization for the whole of the region. . . ."

The Air-freight Business

BOEING'S latest direct-cost estimate for the 735 (the all-freight swing-tail version of the 707) is three U.S. cents per ton-mile. Double this figure for the total operating cost, add a couple of cents or so per ton-mile for middle-men and profit, and you have a freight rate of 8-10 cents per ton-mile.

This is pretty theoretical stuff—assuming, no doubt, maximum utilization and a high load-factor—but it shows something of the future prospects. Present practical all-cargo rates average about 18 cents per ton-mile, but the Canadair CL-44 and (if it comes off) the GL-207 development of the Lockheed C-130 should be able to do, in day-to-day practice, at least as well as a less flexible turbojet freighter.

However futuristic such rates may seem, there is no doubt that the air freight business, even at present rates, is, at long last, showing real signs of development. Some of these signs were emphasized, in our issue of April 10, 1959 (pp. 431-433), by way of introduction to articles on the CL-44 and Short Britannic. Much of the 1958 freight development in the U.S.A.

CARIBOU IN EUROPE.—On its first overseas journey, a de Havilland Caribou flew from Toronto to Hatfield, via the Azores, earlier this month. After demonstrations at Hatfield this week, the Caribou is setting off for a tour through the Middle East and Asia.

Photograph copyright "The Aeroplane and Astronautics"

Air Transport . . . .

can be put down to the fact that fill-up capacity and empty aircraft became available during the recessional period. But there is more to it than that.

Flying Tiger Line suggests that, using CL-44s, the freight rates will, within the U.S.A., be brought down to 13-14 cents per ton-mile and that some commodity rates will be as low as 10 cents. At these rates this carrier estimates that, by 1965, its revenue ton-miles will increase from the 1958-59 figure of about 90 million to 600-700 million.

In the British world of more general charter business, there seems to be some minor chicanery going on. A recent bulletin from a broker remarks, without acerbity, that "some confusion has arisen recently as the result of certain lists of empty leg aircraft which have been widely circulated, but which have not been entirely accurate. It is the policy of some carriers to quote an empty leg, say to the Far East, without having a return load fixed, in the hope of generating outward traffic, which, if it arises, they then attempt to negotiate subject to obtaining a return load." The note adds: "This often wastes a great deal of time and, until clarified, gives a quite false impression of the market pattern."

An earlier report from another broker offers some variety in the way of current airlift inquiries apart from the perennial demands for the movement of ships' crews. The oddments included 20 tons or so of machinery, in two pieces, to be taken from Baltimore to London this month; seven or so tons of cargo on four dates in December and January for transport from Copenhagen to New York; 12 tons of cargo between Copenhagen and Johannesburg at the turn of the year; and 17-20 tons, at the end of this month, for Buenos Aires from Frankfurt.

Pan American is cutting its U.S.A.-Orient rates by about 50% on January 1 and is tripling its trans-Pacific cargo schedules from November 14. Japan Air Lines is lowering its charges in reply.

No Change for the Independents

NO significant improvement in the situation of the independent airlines is shown in the annual report of the British Independent Air Transport Association, which was holding its annual dinner on November 11, after this issue went to press. The statistics for scheduled, charter and contract operations in the year ended June 30, 1959, are summarized here.

It has become increasingly clear, over the past few years, that the independent operators have effectively reached the limit of expansion possible under existing regulations, and BIATA therefore pins its hopes for the future on "a creative policy" which it believes the Government is now ready to implement. In the president's foreword to the report, Mr. Eric Rylands says:

"The main problem is how to regulate the air transport industry so that both the Airways Corporations and the independents form complementary and expanding instruments working together to create the strongest possible British civil air transport contribution to international operations. This is no question of mere prestige; it is a matter of vital concern to British enterprise.

"It is essential to this end that the independents be allowed to develop those sections of the industry which they have created; that they should be encouraged to develop new forms of service; that they should be protected and not be penalized; that success should be promoted and not frustrated and that security of tenure of rights be assured. . . .

"The coming year is one of hope. There will be continuity of Government which in turn means an understanding of the requirements of the industry. There will be readiness on the part of operators to co-operate with the Government and the Airways Corporations alike."

The tabulated statistics do not make altogether clear the position of the independents which, Mr. Rylands stressed, must achieve a high rate of progress in order to remain in a satisfactory position. "Anything short of quick advancement means a positive decline." The following notes are a summary of the explanations given in the report.

The total capacity produced by all BIATA members on all operations increased to 171 million capacity-ton-miles—approximately 24% of the total U.K. air transport effort. General scheduled services accounted for 55% of the total passengers carried and 22% of the passenger-miles performed; inclusive tours, 12% of passengers and 14% of passenger-miles; charter and contract, 23% and 15% respectively; and air trooping 10% and 49% respectively.

On scheduled services the number of passengers declined or remained static on all but short cross-Channel and inclusive tour operations—a disappointing result attributed to unsettled economic conditions. Internal services suffered a major reverse in which increased fares were a contributory factor. Colonial Coach Services were static and their future remained obscure. Inclusive tours showed reasonable expansion, but the report again stresses the industry's need to have long-term approval, from foreign governments as well as the British Government, in order to promote these services adequately.

Some space is given in the Report to answering B.E.A.'s comments about inclusive tour services in its own *Annual Report and Accounts, 1958-59* (see our issue for September 4, p. 87). Briefly, the points made by BIATA in this respect are that, in the views of the A.T.A.C., no material diversion of B.E.A. traffic has occurred; that B.E.A.'s new policy of promoting I.T. traffic is a result of the independents' competitive spur and can only be in the general interest; that B.E.A. is apparently demanding to be "able to compete equally with the independent airlines" while the latter cannot compete with B.E.A.; and that B.E.A. has been as free as the independents to develop I.T. services since 1952, had it so wished.

Freight tonnage and ton-miles on scheduled all-freight services showed substantial improvement, but there was still no indication of a major "break through." The independents lacked flexibility, especially as regards freight rates, which were generally higher than the operators were prepared to offer. Vehicle ferries had a successful year, with a 34% increase.

Charter and contract operations showed little improvement, but the introduction of modern four-engined equipment is bringing a change which is "gratifying and clearly in the British interest." The B.E.A. suggestion that "closed group" charters should be subject to some form of A.T.A.C. approval is firmly rejected by BIATA as interfering with the basic right of the public to hire a vehicle for its own use.

The introduction of modern aircraft types for trooping led to a general disturbance during the year, causing redundancy of aircrew and other personnel and substantial difficulties in using the older aircraft displaced by Britannias and Viscounts.

STATISTICAL SUMMARY OF OPERATIONS OF BIATA MEMBERS
(Years ended June 30)

Scheduled Services

	1958–59	% change on 1957–58	1957–58	% change on 1956–57
Capacity ton-miles	46,642,000	+12	41,882,000	+20
Load ton-miles	29,893,000	+20	25,051,000	+14
Overall load factor	64.1%	—	59.9%	—
Passengers carried	792,797	+4	758,056	+12
Passenger-miles	189,068,000	+7	178,979,000	+10
Freight (short tons)	113,777	+31	86,656	+26
Freight ton-miles	12,731,000	+48	8,569,000	+23
Mail (short tons)	22	−48	44	−37
Mail ton-miles	27,600	−17	33,000	−35
Aircraft miles	11,465,000	−7	12,512,000	+7
Inclusive tours (*not included in the above*)				
Capacity ton-miles	12,640,000	+18	10,772,000	+44
Passengers	172,755	+19	144,878	+34
Passenger-miles	116,076,000	+17	99,545,000	+45

Charter and Contract Operations

	1958–59	% change on 1957–58	1957–58	% change on 1956–57
Capacity ton-miles available	112,123,000	+1	111,448,000	—
Load ton-miles	103,545,000	+7	96,150,000	+8
Passengers carried:				
Civil	331,717	+8	307,692	−4
Military	142,085	+3	137,821	−12
Total	473,802	+6	445,513	−7
Passenger-miles:				
Civil	130,061,000	+27	102,274,000	−30
Military	419,557,000	+4	402,604,000	−22
Total	549,618,000	+9	504,878,000	−23
Freight (short tons)	17,165	−43	30,030	−45
Freight ton-miles	51,201,000	+8	48,522,000	+65
Aircraft miles	19,384,800	−14	22,225,907	+16

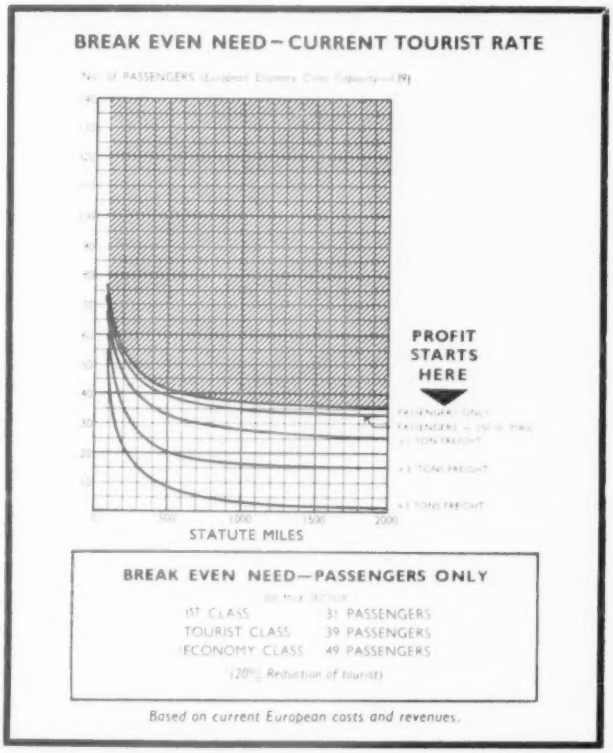
Only the VANGUARD

has this low-cost story

THE CONCLUSIONS to be drawn from this simple graph are among the most significant ever put to airline operators. It shows at a glance that the Vickers Vanguard will break even on total costs (indirect costs are taken as 100 per cent of direct) with passenger loads no higher than those actually carried by Viscounts today.

With three tons of freight the passenger break even requirement can be as low as 21 people falling to only 8 passengers when five tons of freight is carried for 500 miles. The Vanguard is a profitable aircraft on today's payloads yet it has room for the inevitable expansion of traffic which, even at a modest progress, makes the Vanguard the biggest potential money earner ever built.

In addition to its outstanding economy, the Vanguard is fully competitive in speed (425 m.p.h. cruise), and its turbo-prop flexibility will enable it to maintain schedules as good as any, while allowing for realistic traffic conditions.


BREAK EVEN NEED—CURRENT TOURIST RATE
PROFIT STARTS HERE
STATUTE MILES
BREAK EVEN NEED—PASSENGERS ONLY
1ST CLASS 31 PASSENGERS
TOURIST CLASS 39 PASSENGERS
ECONOMY CLASS 49 PASSENGERS
Based on current European costs and revenues.

Of all the airliners only the Vanguard has all these features

425 m.p.h. cruising • Freight capacity 7/8 tons at normal densities • Full routeing and A.T.C. flexibility • Can use normal existing airfields • Quick turn-round • No airfield noise problems • Ten years' unique Vickers/Rolls-Royce turbo-prop experience . . . ***And it is 'Viscount' quiet.***

VICKERS VANGUARD

FOUR ROLLS-ROYCE TYNE TURBO-PROP ENGINES

● ***The airliner with the biggest profit potential ever offered to the operator***

VICKERS-ARMSTRONGS (AIRCRAFT) LIMITED WEYBRIDGE SURREY

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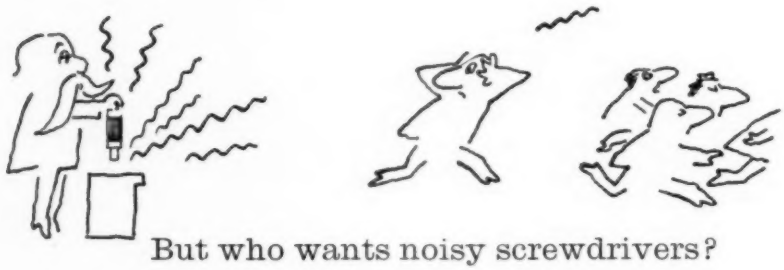
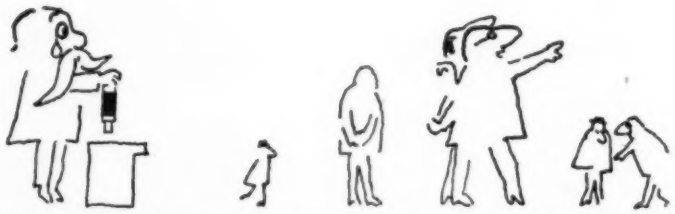
Once upon a time at Exhibitions, Buyers were instantly attracted to the **Desoutter** stand by the noise of the pneumatic screwdrivers.



But who wants noisy screwdrivers?

And so . . . spending a whole week's tea money on research our M.D. sweated and slaved, starved, went hungry, turned white before his time, and finally emerged triumphant, the inventor of the **silent Desoutter screwdriver!**



Wasn't it Shakespeare who said 'Never make a silent screwdriver—no one will ever hear it'?

Desoutter Bros. Ltd., The Hyde, Hendon, London N.W.9. Telephone: Colindale 6346

CIC 323

The Fighting Services

J.E.H.U. Disbandment

IT is understood that the Joint Experimental Helicopter Unit at Middle Wallop is to be disbanded at the end of this year. The unit's helicopters are to be handed over to R.A.F. Transport Command, who intend to operate them as part of the transport force.

J.E.H.U., a joint Army/R.A.F. unit, has undertaken a great deal of work in testing and evaluating the use of helicopters for Army requirements. Although no official comment has yet been made on the disbandment, it seems certain that this joint Service show is to end.

C.F.S. Goodwill Tour

TWO Flying Training Command Canberras were to leave the Central Flying School, R.A.F. Little Rissington, on November 9 for a goodwill visit to the Royal Australian and New Zealand Air Forces. Led by the Commandant of C.F.S., Air Cdre. J. N. H. Whitworth, D.S.O., D.F.C., the aircraft are also to visit the headquarters of the Royal Thai, Burmese and Pakistan Air Forces.

This tour forms part of a programme of periodic visits to flying units of the Commonwealth and other air forces for the exchange of views on flying training instruction. Its itinerary includes Ceylon, Singapore, Darwin, Melbourne, Ohakea (R.N.Z.A.F.) and Wellington. The return flight will cover visits to Bangkok, Rangoon, Delhi and Karachi, and the round trip will last 31 days and cover approximately 27,000 miles.

Three R. Ceylon A.F. officers are at present under instruction at C.F.S. and three others have completed the instructors' course. Three Australian Army officers have been trained at the school and the R.A.A.F. is represented at Little Rissington by an instructor of Flight Lieutenant rank. Since 1945 five R.N.Z.A.F. pilots have completed the C.F.S. course, and during the past 10 years 17 R. Thai A.F. officers and 21 Burmese A.F. officers have received instruction at C.F.S.

No. 600 Squadron Plaque

MEMBERS of No. 600 (City of London) Squadron Flying Group are shortly to have a plaque in their premises at Biggin Hill commemorating the Squadron's achievements during the Second World War. To be carved in wood, the plaque will carry the Squadron's crest, and will show its locations and other wartime details of interest.

The No. 600 Squadron Flying Group now has approximately 120 members, of which fifty per cent. are fully qualified and the remainder are undergoing training. A Percival Prentice is used for touring and flying instruction is given in a Tiger Moth.

An early member of the Squadron, Wg. Cdr. W. H. Wetton, is chairman of the Group and Sqn. Ldr. A. T. Warburton, a former adjutant, is secretary. Flying instruction is in the hands of Flt. Lt. J. Miles. Affiliated to the Popular Flying Association, the Group was started at Croydon after the Auxiliaries were disbanded in 1957, but moved to Biggin Hill prior to the closing of Croydon.

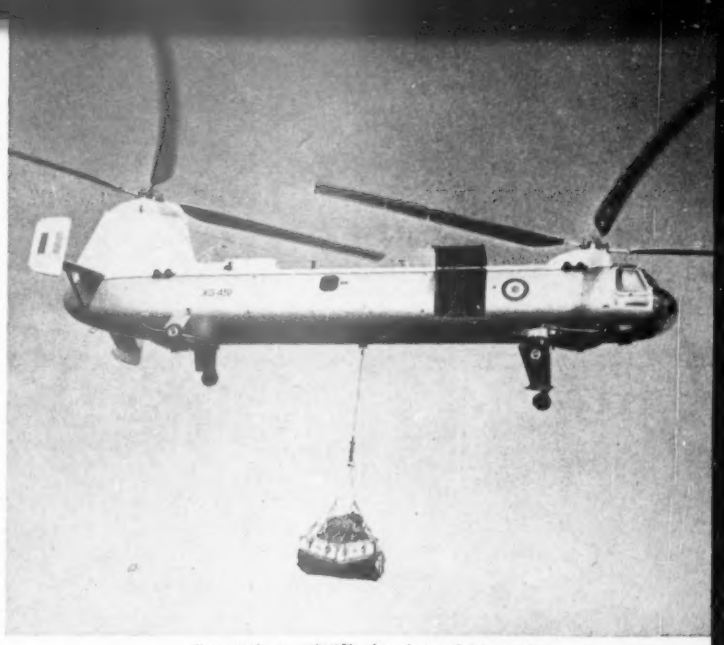
Trainer Demonstration

DURING a recent visit of R.C.A.F. instructors to the Central Flying School, R.A.F. Little Rissington, the Hawker Hunter T.66A and Folland Gnat Trainer were demonstrated. Without using tail parachutes, both trainers used less than half of the C.F.S. 1,600-yd. runway, and with tail parachutes and the help of a 15-knot wind, it was possible to stop the aircraft on landing within 550 yd. from the runway threshold.

R.A.F. Recruit Training

AFTER November 20 all new recruits into the R.A.F. will receive their eight weeks basic training at R.A.F. Bridgnorth, which then becomes the sole recruit training school in the Service. On that date, No. 4 School of Recruit Training at R.A.F. Wilmslow will close after a final passing-out parade at which Air Vice-Marshal R. Faville, Air Officer Commanding, No. 22 Group, Technical Training Command, will take the salute.

Three years ago there were five stations where new recruits were trained, but Hednesford, Padgate and West Kirby have each been closed in turn. Now, with National Service nearing its end, one school will meet the requirements of the Service.



Photograph copyright "The Aeroplane and Astronautics"

SERVICE TRANSPORT.—Now in production for the R.A.F., the Bristol 192 is designed to meet a number of Service requirements. These cover troop and supply transportation, search and rescue operations, and paratroop and supply dropping duties.

R.A.F. Appointments

THE following are among recent Royal Air Force appointments:—

Air Ministry: Wg. Cdr. H. Bentley, M.B.E., Wg. Cdr. F. H. P. Austin, Wg. Cdr. J. O. Dalley, O.B.E., D.F.M., Wg. Cdr. A. H. Gibb, and R. A. Seymour, A.F.C., to the Department of the Chief of the Air Staff; Wg. Off. F. R. Pentland, W.R.A.F., to the Directorate of the W.R.A.F.; Sqn. Ldr. D. L. Attlee to the Department of the Air Member for Personnel, with the acting rank of Wg. Cdr.

Bomber Command: Wg. Cdr. N. C. Thorne, A.F.C., to R.A.F. Wyton to command No. 58 Squadron.

Fighter Command: Wg. Cdr. S. Williams, O.B.E., to Headquarters No. 11 Group, R.A.F. Marlesham Heath, as Senior Technical Staff Officer, with the acting rank of Gp. Capt.; Wg. Cdr. J. S. Hamilton, D.F.C., A.F.C., to R.A.F. Watnall to command the Air Traffic Control Centre; Wg. Cdr. J. W. J. Leggett to Headquarters for operational, tactical and training duties.

Transport Command: Gp. Capt. G. C. Allen, O.B.E., to Headquarters as Senior Equipment Staff Officer; Gp. Capt. I. J. Spencer, D.F.C., to R.A.F. Benson to command.

Flying Training Command: Wg. Cdr. L. J. Ward, D.F.C., to R.A.F. Shawbury to command the flying wing.

Middle East Air Force: Wg. Cdr. F. Ruskell, D.F.C., to Headquarters as a member of the Joint Strategic Planning Staff.

Far East Air Force: Gp. Capt. R. J. Dempsey, D.F.C., A.F.C., to Headquarters to the Far East Establishments Committee; Gp. Capt. E. V. Stokes, C.B.E., B.Sc., to Headquarters as Command Signals Officer.

R.A.F. Germany: Wg. Cdr. M. J. A. Shaw, D.S.O., to Headquarters 2nd T.A.F. for air planning duties.

Other Appointments: Wg. Cdr. R. D. Doleman, D.S.O., D.F.C., and Wg. Cdr. N. Williamson, D.F.C., to command No. 13 and No. 14 Joint Services Trials Units respectively.

More Service News

R.A.A.F. Crash Barriers.—Seven R.A.A.F. airfields—Butterworth, Malaya, and Amberley, Williamtown, Richmond, Sale, Leverton and Pearce, Australia—are to be fitted with the Swedish Safeland aircraft crash barrier. Installation of the equipment has already started.

Nuffield Trust Donation.—R.A.F. Gaydon has received a grant of £2,400 from the Nuffield Trust for the building of a hobbies centre on the station. Expected to be ready for use before the end of this year, the centre will cater for art, pottery, handicrafts, camera and radio clubs.

St. Clement Danes.—A booklet on the Church of the R.A.F., St. Clement Danes, has now been published. Copies, price 2s. 6d. may be obtained from the Resident Chaplain, St. Clement Danes Church, Strand, London, W.C.2. A proportion of the proceeds from the sale of the booklets will go to church funds.

R.O.C. Recruiting.—During the first three-quarters of this year 1,946 men and women joined the Royal Observer Corps compared with 2,553 for the whole of 1958. The Corps present strength is 15,747 observers, 132 higher than at the start of this year.

Comet Flights.—The 10 Transport Command Comet 2s of No. 216 Squadron (Wg. Cdr. R. G. Churcher) have now logged 10 million miles. The Squadron has been operating the transports on scheduled services and special flights for a little over three years.

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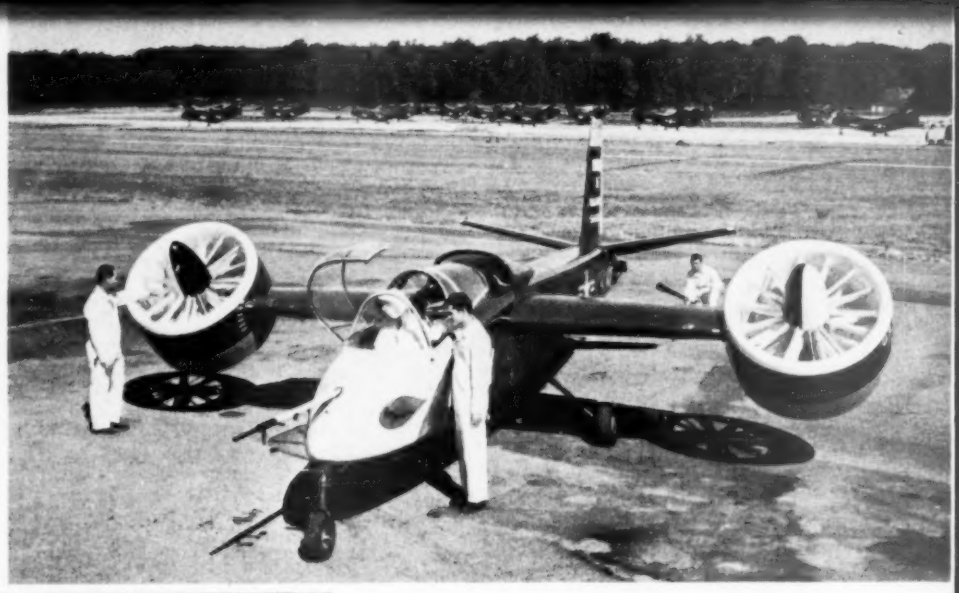
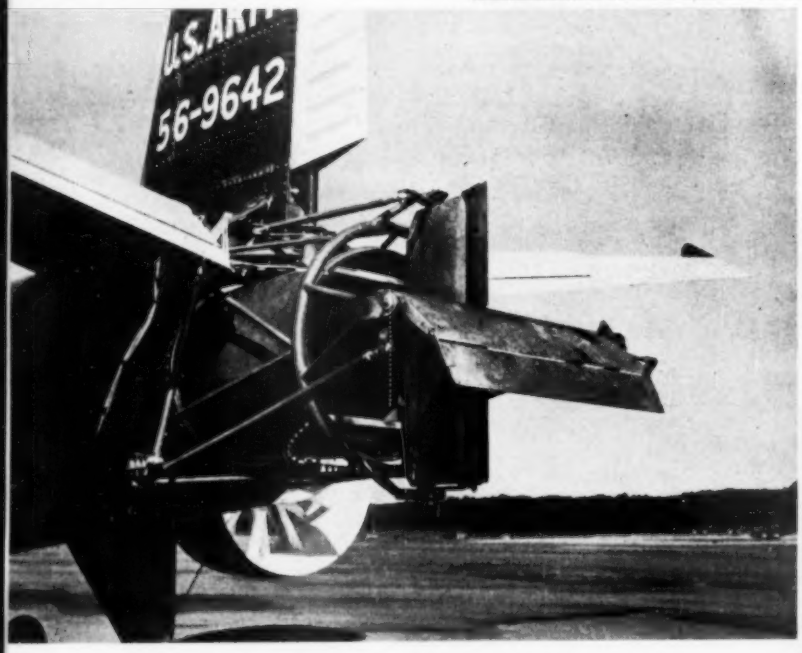
THE AEROPLANE
and ASTRONAUTICS

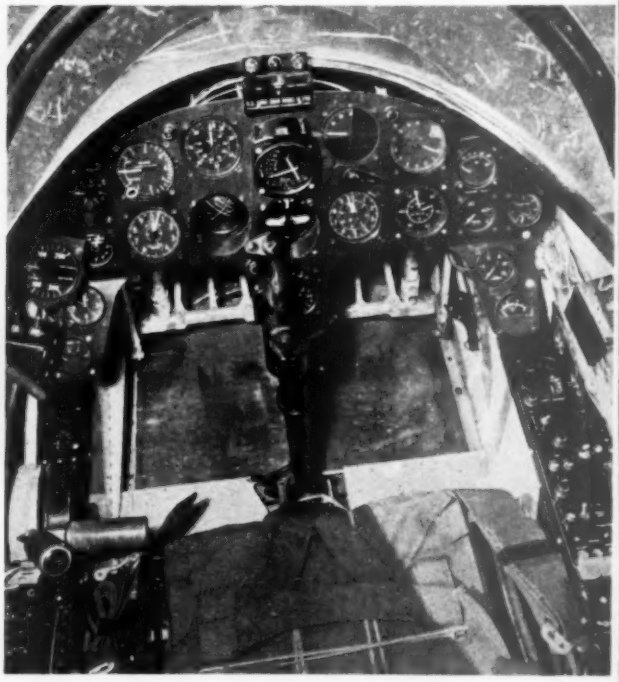
VTOL by Doak

(Howard Levy photographs)

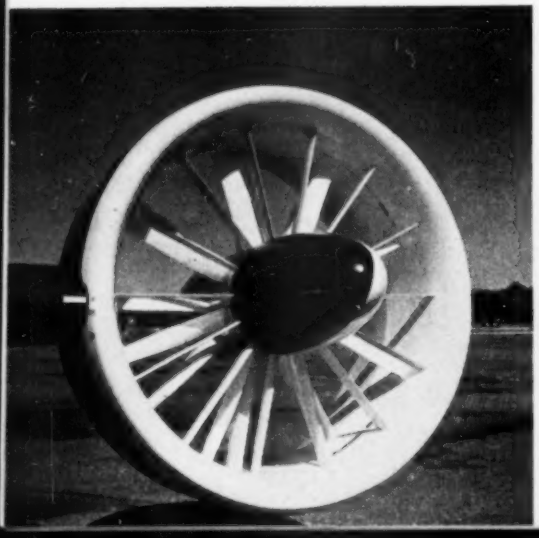


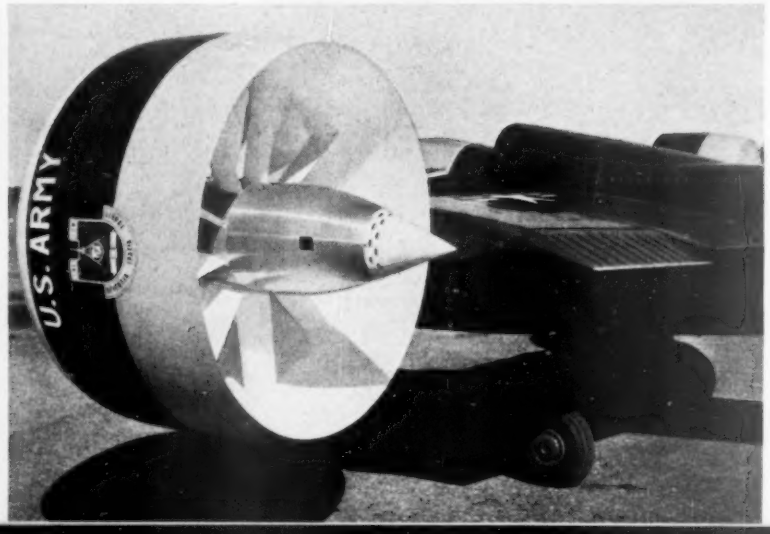


The Doak VZ-4 Da ducted-fan convertiplane has now completed its flight tests and initial "acceptance demonstrations." It is powered by an 825-h.p. Lycoming and has a wing span of 16 ft., less tip ducts; wing area is 96 sq. ft., aspect ratio 2.67 and taper ratio 0.675. To date, the craft has accumulated more than 150 hours of operational time, including 17 full transitions.



Above, articulated stainless steel cruciform vanes located in the turbine exhaust provide pitch and directional control during hovering. Right, the cockpit has conventional aircraft controls. Below left, each duct has 14 glass-fibre inlet guide vanes which deflect to provide roll control during hovering; the fans have eight fixed-pitch stainless steel blades (3.75 in max. chord); nine stainless steel stator blades are situated aft of the fan; duct centre body is 6 ft. long; fan speed is 4,£00 r.p.m. max. Below right, a rear view of the fan.





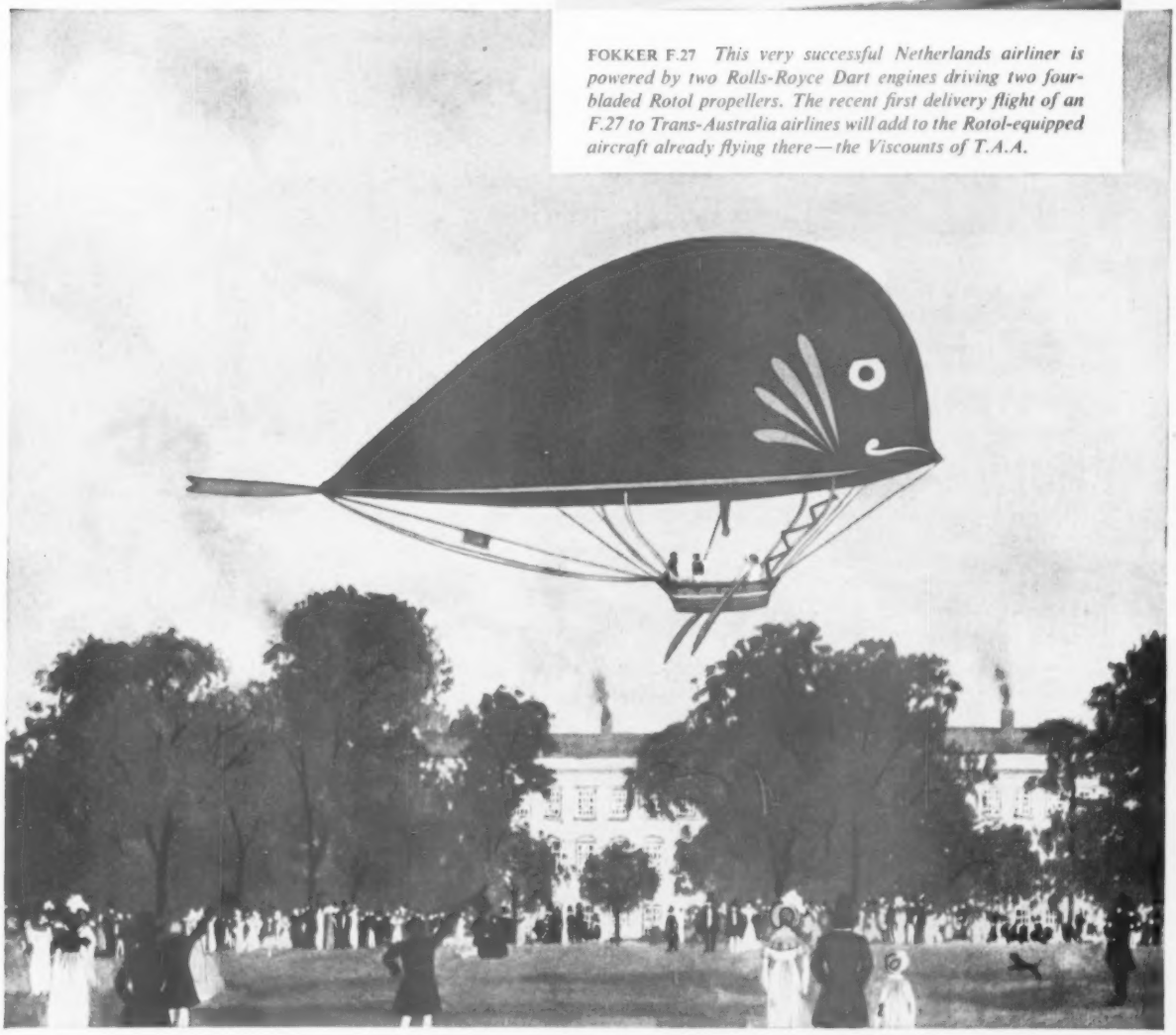
Propulsion through the ages...

A charming Regency folly

Among the many designs for dirigible airships which appeared between the invention of the balloon in 1783 and the arrival of the first practical airship in 1852, the most delightful was the DOLPHIN, designed by Pauly & Egg in 1816-17. Apart from the absurd "oar" propellers, it was to have had an interior balloonet to preserve its shape, and a device (visible here) to alter the trim by means of a moveable weight. Such ingenuity surely deserved success—but alas, the triumphal flight shown here took place only in the artist's imagination.

From near-fantasy to historical fact: Rotol were the pioneers of the turbo-prop, for they designed and built the propellers for the first turbo-prop aircraft to fly—and today over 100 airline and aircraft operators fly machines with Rotol propellers.

FOKKER F.27 *This very successful Netherlands airliner is powered by two Rolls-Royce Dart engines driving two four-bladed Rotol propellers. The recent first delivery flight of an F.27 to Trans-Australia airlines will add to the Rotol-equipped aircraft already flying there—the Viscounts of T.A.A.*



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FIRST
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ALL-NEW,
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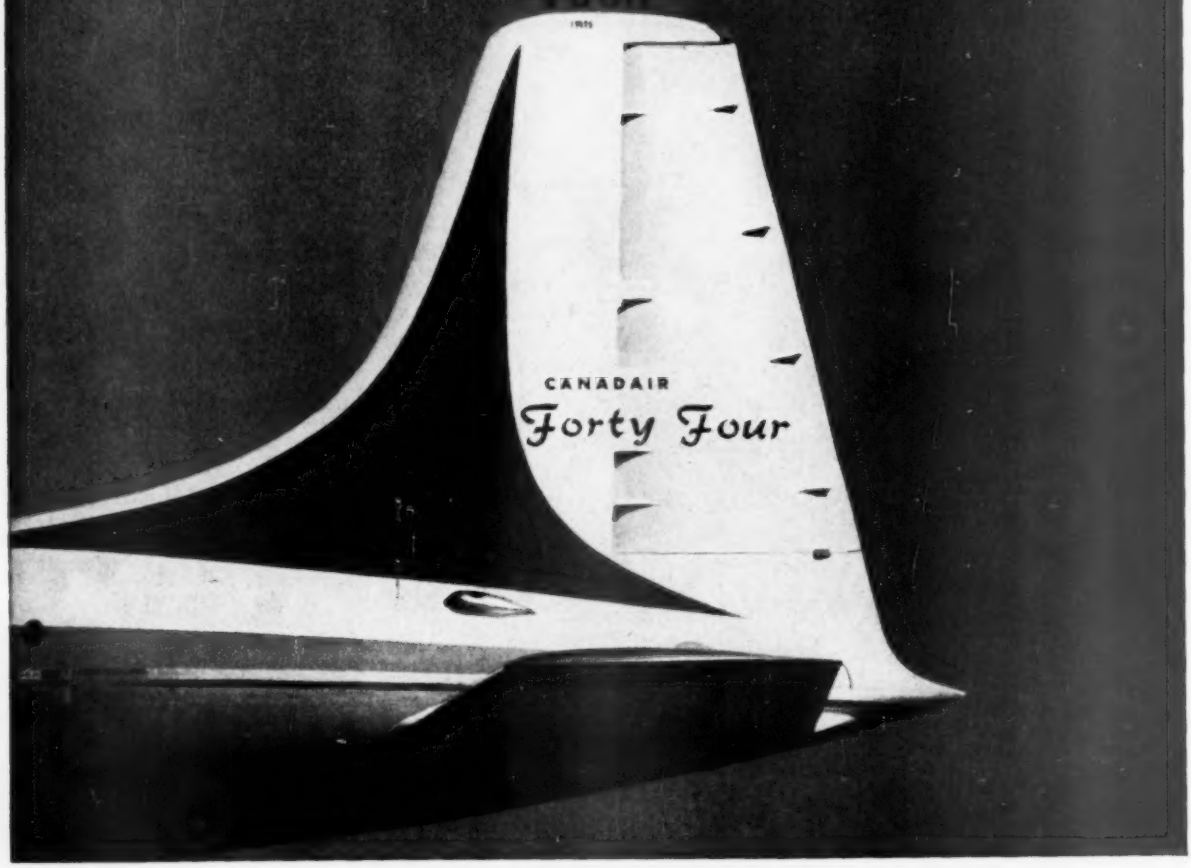
"FORTY
FOUR"



THERE ARE NO IFS, ANDS OR BUTS ABOUT THE CANADAIR FORTY FOUR. It is a "here and now" swing-tail cargoplane, at least 18 months ahead of comparable aircraft still in the "talking stage." The turbo-prop "Forty Four" is in full production for two leading American airlines and the military services of Canada. It has already been through the development stage and its Rolls-Royce Tyne engines have been thoroughly tested and proved. With the "Forty Four" in your fleet, you can be 18 months ahead of competition and in a most favorable earning position.

First photographs of the Canadair Forty Four, taken September 30, 1959 in Montreal. The "Forty Four" is now on the line for Seaboard and Western Airlines Inc., The Flying Tiger Lines and the Royal Canadian Air Force.

CANADAIR LIMITED, MONTREAL, CANADIAN SUBSIDIARY OF
GENERAL DYNAMICS CORPORATION

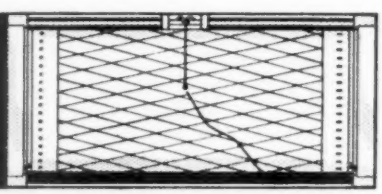
working pilot

The IFALPA delegate speaking to the ICAO Special Meeting, Montreal, February 1959

I should like to describe what we have been able to do using Radar for departures. Four aircraft taxi out at the same time. They are fully loaded, it is a hot night so they have an immediate problem. After take-off Departure Control wants immediate contact so we give them a call. Number 2 aircraft takes off two minutes later, and receives the same clearance until he picks up Radar Departure, who say " Turn left heading 050° "—now this is into inbound traffic, which means he will require continuous attention from Control to make sure he picks his way safely through the incoming traffic. Aircraft number 3, two minutes later, same as before, except when he picks up Radar Control, The Controller says " hold 4,000 ft. heading 130°," (he has vectored him off so as to clear the way for aircraft number 4). Aircraft number 4 receives the same departure, but he is told to hold 3,000 ft., and the Radar Controller's attention will also be especially directed towards him because he is bucking the flow of traffic in a place where he does not properly belong.

With regard to the overall achievement, we have now vectored four aircraft into a single airway. Only one of them has achieved the altitude he wanted, and unfortunately he will have to come down through the altitude of the others. Radar is a marvellous device, and it has solved many of our problems, but it is *not* a navigational aid. An area coverage system would not solve every problem, but it would provide the capability of outbound tracks that would take us immediately out of the area from whence discrete tracks could be drawn giving lateral separation of a safe order. This is a problem which is incidental to the use of single track airways, and we feel **it can be solved by lateral separation which should be made available through pictorial presentation coupled with area coverage.**

THE DECCA NAVIGATOR



THE NAVIGATION SYSTEM FOR THE JET AGE

THE DECCA NAVIGATOR COMPANY LIMITED LONDON

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AIRLINES OF THE WORLD

WHEN this special number appeared a year ago the airlines were just entering the so-called turbojet era and the future depended to a considerable extent on the operational success of the big-capacity, long-haul giants during their first 12 months or so in scheduled service.

Despite a few incidents which might, with less skill and luck, have become major catastrophes, things have gone very well and the traffic has made maximum use of the still-limited available turbojet capacity.

With the turbojets now firmly in service and popular with passengers, the airlines are entering a period of hard slogging to maintain the necessary high load factors in an increasingly competitive situation and to keep their finances in order. Luckily, the North American recession, which pulled down the rate of World air-traffic increase for 1958, did not develop into a depression and the traffic-increase figures for 1959 have been more or less back to normal in nearly all areas.

But a number of significant happenings during the year have been directly or indirectly connected with the now-accepted fact that the airlines have overreached themselves in their competitive re-equipment scramble. There has, for

instance, been the trend—exemplified by Europe's Air Union (which has now been officially approved by the four Governments concerned)—towards the pooling of effort and facilities. There have been, too, very strong signs that the inevitable collapse in the market prices for piston-engined aircraft will make serious and continued inroads into the profit-margins until these lost values have been finally written off. Even next year's "open-rate" situation for the majority of World fares can be considered to be, at least partly, the result of over-buying by the airlines.

On the credit side, the need to fill the rapidly increasing capacity has driven airlines to a vigorous and successful exploitation of the air-freight market. Increasing success on this side of the airline business may well save the overall situation; this is a market the surface of which has hardly yet been scratched and figures given later in this introductory article show how the rate of increase was improving even during 1958.

There will undoubtedly be, for good economic reasons, a slow but steady development of the co-operative trend which started in practice at about this time last year when S.A.S. and Swissair announced an equipment-interchange and joint engineering agreement. Air Union, which had been mooted as long ago as 1957, is due to come into action on April 1 next year with initial emphasis on co-ordination on the commercial side and with rationalization of equipment and engineering to follow. Other possible unions may well be developed in the Commonwealth, the Middle East, Asia and Africa.

A hint of the losses incurred in the writing-down of old-fashioned, but thoroughly effective, equipment was to be seen in B.O.A.C.'s current report and accounts, in which no less than £6 million has been written off to cover the capital loss in disposal of aircraft and "abnormal development costs." Doubtless the Corporation has been depreciating aircraft and development costs at too slow a rate, but the signs are clear enough. Maybe other IATA members, faced with the same kind of situation, will eventually agree to lower fares and rates for propeller aircraft, so that these can be kept in useful service—with the important incidental prospect that a much bigger traffic market may be tapped.

The failure of the IATA airlines to agree, by and large, on fares for next year was caused, rightly or wrongly, by B.O.A.C.'s insistence on the introduction of economy fares (at flat reductions on present tourist fares) on the routes to Africa, the East and Australia. The Corporation was supported by certain airlines in certain areas, but not consistently by any particular group or groups, and no compromise solutions were acceptable.

The result was that, as two of the three IATA traffic conference areas were linked in these fare disputes, there was final agreement only for the Western Hemisphere (including the Atlantic) and among operators within Europe and the Middle East. B.E.A.'s policy of trying for a number of separate off-peak and seasonal reductions on its European network, rather than for any flat overall reduction, succeeded to the extent of a series of special fares involving, perhaps, 25% of its total annual seat-mileage.

World traffic increases and decreases 1957-58

	% change		Area	% change
	Domestic	International		
U.S.A.			Africa	+ 4.6
American	− 0.6	+ 7.4	Canada	+13.7
Braniff	+ 8.3	− 1.5	U.S.A.	+ 1.1
Capital	− 5.9	—	South America	+11.8
Continental	+16.6	—	Middle East	+11.3
Delta	+ 9.7	−16.7	Far East	− 3.2
Eastern	−13.4	+ 8.5	Australasia	+14.9
National	+12.3	+25.0	Europe	+10.6
Northeast	+67.7	—		
Northwest	+18.3	+20.7		
Panagra	—	− 2.3		
Pan American	—	+ 2.2	IATA members	
Pan American (Atlantic)	—	+11.0	World average	+ 9.3
Trans World	+ 0.1	+22.7	Domestic services	+ 6.4
United	+ 8.9	+ 1.8	International services	+14.8
Western	−26.2	+77.3	ICAO World average	+ 4.1
Overall average	+ 1.1	+ 6.2		

On the left are increase and decrease percentages for the domestic and international operations of the principal U.S. carriers. Above, right, are percentage average changes for groups of selected carriers in different areas and, below, World averages for IATA members and for all operators (ICAO figures) except those in the U.S.S.R. and China.

Traffic in 1958

Although, because of the American recession, the World's 1958 traffic figures were comparatively poor, it is very difficult to see any clear patterns of depression. Obviously the effects can be seen primarily in the results of the major U.S. domestic operators, with an average increase of only 1.1% and, as this traffic amounts to very nearly half that for the whole of the World's air transport, the result was that the overall average was held down. Nevertheless, it is hard to see a pattern even in these North American results.

As the table on this page shows, the results for these big U.S. domestic carriers were wildly variable in detail. If we ignore the special case of Northeast Airlines, with its enlarged Florida traffic potential, the total ton-mile figures show variations between an increase of 18.3% and a decrease of 26.2%. Nevertheless, the total trend showed a no more than marginal increase and the variations can only be accounted for by the nature of the passenger and cargo traffic normally handled in the different operators' areas of influence.

Curiously enough, the 13 local service carriers' ton-mileage (not given in the tables) showed less of the effects of the recession. None of them recorded a decrease in traffic and one (Bonanza Airlines, appropriately enough) recorded an increase of 28%. The average increase for these carriers worked out at 10.3%, with an overall load factor of 49.7%—which was considerably higher than the figure for 1957.

Outside the U.S.A., the larger regional carriers showed much better results, except in the Far East. The tabulated increase/decrease results on this page have been based on a somewhat arbitrary selection of airlines which were large enough to affect the average, but whose operations are at least predominantly regional in character. This selection could not be applied in the cases of Europe, Canada and South America because in these areas nearly all the larger carriers have long-haul networks.

Here, again, the variations were found to be very marked with, for instance, Brazil's Varig raising the average for South America and Japan Air Lines' good results preventing the area figure from plunging very far below zero. So far as its two big carriers are concerned, Canada did not appear to suffer from the recession, and even their combined domestic traffic increased by 11%.

Another feature of the 1958 results (at least for those of IATA members) was the increase in cargo ton-miles by 21.5%. This figure was boosted (in the same way as that in which the total ton-miles were depressed) by the U.S. results. Obviously, special efforts were made to obtain fill-up freight, but this effort would not have borne useful fruit if shippers and others had not already learned that air carriage can be economic. The good results are therefore likely to continue in future years.

The availability of capacity was shown in the large increase in international non-scheduled work. The IATA figures show that available non-scheduled ton-miles increased by nearly 64% and

(*Continued on page 467*)

Scheduled IATA traffic increase percentages, 1950–1958

	1950	1951	1952	1953	1954	1955	1956	1957	1958
	%	%	%	%	%	%	%	%	%
Passengers carried	14.8	23.2	13.5	20.1	12.7	16.4	15.9	10.2	7.3
Miles flown	5.1	8.8	12.6	13.6	7.4	11.1	12.0	10.1	8.6
Cargo ton-miles	26.2	9.3	7.6	13.0	8.9	14.6	16.1	9.3	21.5
Mail ton-miles	11.4	19.3	9.5	9.6	17.5	13.9	10.1	4.9	10.3

Scheduled operating revenues and expenses, 1950–1958 (ICAO figures)*

	1950	1951	1952	1953	1954	1955	1956	1957	1958†
Revenues (U.S. $millions)	1,543	1,804	2,050	2,314	2,560	3,025	3,510	3,971	4,200
Expenses (U.S. $millions)	1,502	1,780	2,063	2,317	2,528	2,947	3,426	4,012	4,360
Profit or loss (U.S. $millions)	+41	+24	−13	− 3	+32	+78	+84	−41	−160
Profit or loss as % of expenses	+2.7	+1.3	−0.6	−0.1	+1.3	+2.6	+2.5	−1.0	−3.7

* Excluding the U.S.S.R. and China. † Estimated.

These two tables show the traffic increases (above) and the financial results of all the World's airlines over a nine-year period.

THINK of the price of it...

(as if you wouldn't)

Think of the cost of a 47-seat jet-prop airliner. Make it a really up-to-the-minute job . . . long-life fuselage pressurized for passenger comfort . . . quickly adaptable for freight carrying.

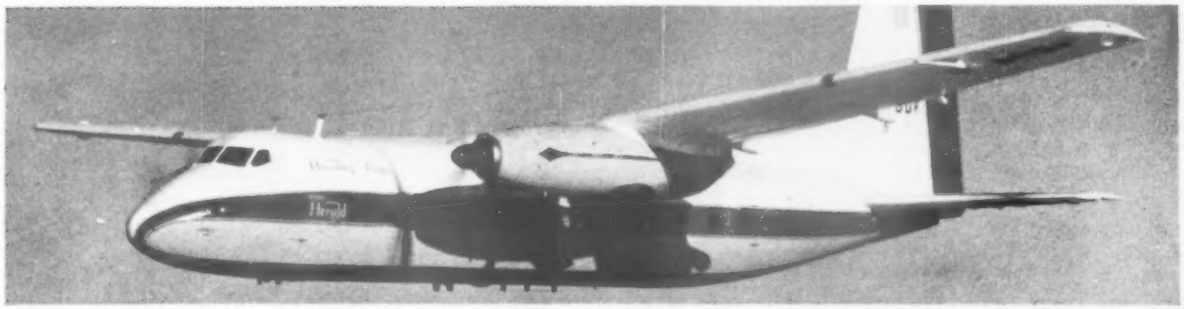
Give it the penny-farthing-per-passenger-mile economy of two airline-proved Rolls-Royce Darts. Specify unbeatable small-airfield performance without sacrificing passenger appeal.

Add up all the benefits: take away a large part of the price you first thought of: and you *must* have the economical low cost

HANDLEY PAGE **DART**

Herald

JET-PROP TRANSPORT



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MUCH MORE ENERGY FOR MUCH LESS WEIGHT

New Bristol Aerojet process produces gas storage vessels of great strength—high capacity—exceptionally low weight

High-pressure gas storage bottles have become an essential part of aircraft and guided missile systems. They provide a compact and efficient method of storing energy.

Bristol Aerojet, specialists in the design and manufacture of high tensile steel welded components, have developed a very advanced range of pressure vessels. Operating with great reliability at high stress levels, this new design provides unusually high energy storage capacity for exceptionally low weight.

Made of chrome molybdenum steel, the vessels are welded by the argon shielded tungsten arc process and heat treated to a minimum ultimate strength of 75 tons per sq in. All welds are examined several times during manufacture, both visually and radiographically and are subjected to the same stress as the parent material.

Bristol Aerojet pressure vessels are made in many specified shapes and range from 100 to 2,000-cu in capacity. When compared to forged vessels they show a weight saving of at least 5 lb per 500 cu in and as much as 50%.

Bristol Aerojet Pressure Vessels Specified For Trans-Canada Vanguards

Trans-Canada Airlines have chosen Bristol Aerojet pressure vessels for the Elliot escape chutes in their 20 Vanguards.

Other companies supplied include:

BRISTOL AIRCRAFT LIMITED
BRISTOL SIDDELEY ENGINES LIMITED
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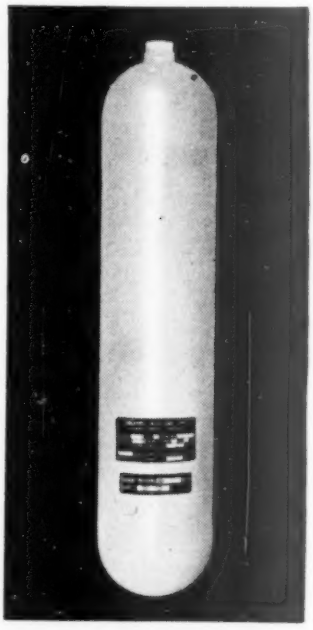
THE PYRENE CO. LIMITED
A. V. ROE & CO. LIMITED
SAUNDERS-ROE LIMITED
SHORT BROS. & HARLAND LIMITED
VICKERS-ARMSTRONGS (AIRCRAFT) LIMITED

If you would like further information, about Bristol Aerojet pressure vessels or high tensile steel welded components, please write to: P. W. Lawson, Civil Sales Manager, Bristol Aerojet Limited, Banwell, Weston-Super-Mare, England. Telephone: Banwell 250.



Type 3135 Pressure Vessel Cylindrical (525 cu in)

Design ultimate pressure	5,000 psi
Maximum inflation pressure	2,500 psi
Free gas volume	1,470 litres
Weight	12 lb

ARB approved

Suitable for CO_2 fire extinguishers and pneumatic systems.

BRISTOL AEROJET

(*Continued from page 466*)

revenue-miles flown by 55%. The 1956-57 increases had been no more than 20.2% and 14.3% respectively.

Because of the apparently regional variations in the effect of the recession there was a reshuffle in the positions of the major carriers between 1957 and 1958. United Air Lines enjoyed better results than American Airlines, so, as the table on this page shows, the former has gone to the top of the list, though American carried more passengers. Eastern Air Lines had a bad year and dropped to fifth place from third, but still carried more passengers than any airline but American.

North Atlantic results continued to show an upward trend which appeared to be untouched by the recession. There was a 26.8% increase in the number of passengers carried by the 17 IATA-member operators over this route—by comparison with a 22% increase between 1956 and 1957. The total of economy and tourist passengers together was greater by nearly 27% than the tourist-class figure for 1957, yet the first-class total also increased by quite a useful margin. Here, again, the increase in non-scheduled passenger and freight movements was most marked—with a 95% increase in the number of passengers and a 66% increase in cargo loads. Overall Atlantic cargo loads increased by about 20%.—H.A.T.

TOP SCORE

Carrier	Revenue tonne/km. (thousands)	Passengers (Relative order in brackets)
1. United	889,183	7,237,815 (3)
2. American Airlines	884,991	7,791,812 (1)
3. Pan American	733,762	2,802,844 (8)
4. T.W.A.	719,676	4,667,039 (4)
5. Eastern	649,854	7,266,864 (2)
6. Air France	380,202	2,371,018 (10)
7. B.O.A.C.	287,659	465,263 (18)
8. T.C.A.	269,549	2,805,723 (7)
9. K.L.M.	258,832	910,880 (16)
10. Northwest	240,645	1,827,129 (12)
11. Delta	239,712	2,825,631 (6)
12. Capital*	215,500	3,541,000 (5)
13. S.A.S.	208,020	1,525,413 (14)
14. National	167,218	1,642,146 (13)
15. Braniff	159,694	2,136,649 (11)
16. B.E.A.	150,480	2,726,138 (9)
17. Sabena	146,917	822,871 (17)
18. Swissair	122,753	1,058,715 (15)
19. Qantas	104,522	148,341 (19)
20. Flying Tiger	101,248	—

* All traffic—other figures for scheduled services only.

WORLD AIRLINE STATISTICS—1958

	As at June 30, 1959*			Revenue miles flown (thous.)	Revenue passengers carried	Revenue passenger miles (thous.)	Freight and mail, tons and ton-miles†	Total revenue, ton-miles†	Average overall load factor achieved	Ton-miles† produced per employee
	Employees	Aircraft capts.	Unduplicated route mileage						%	
AFRICA										
BRITISH WEST AFRICA										
W.A.A.C. and WAAC (Nigeria), Lagos ‡	1,370	—	—	2,600	72,763	22,300	540,000 t.-m.	2,800,000	54.8	—
EGYPT										
Misrair, Cairo	1,831	24	10,250	2,800	133,451	62,800	910,000 t.-m.	—	69	5,350
ETHIOPIA										
Ethiopian Air Lines, Addis Ababa	770	27	9,782	3,327	91,308	47,388	—	—	56.5	—
KENYA										
Caspair, Nairobi	22	3	—	275	3,695	640	—	—	—	—
East African Airways, Nairobi	1,506	35	22,361	4,150	117,294	65,583	2,833 tons 1,795,034 t.-m.	9,041,679	51.6	11,477
MADAGASCAR										
Air Madagascar, Tananarive	—	—	—	687	25,123	—	3,660 tons 412,500 t.-m.	803,000	67	—
MOROCCO										
Royal Air Maroc, Casablanca	533	22	—	2,965	152,435	103,000	3,000 tons	12,500,000	69	—
PORTUGUESE EAST AFRICA										
DETA, Lourenço Marques	383	—	—	1,520	27,130	11,900	296,000 t.-m.	1,495,000	48.9	—
PORTUGUESE WEST AFRICA										
D.T.A., Luanda	380	—	—	1,280	36,378	10,100	253,500 t.-m.	1,210,000	50.2	—
RHODESIA AND NYASALAND										
Central African Airways, Salisbury	1,163	26	12,653	4,008	158,841	84,351	2,281 tons 1,079,990 t.-m.	8,874,757	59.8	12,767
Commercial Air Services, Bulawayo	18	3	3,422	215	2,055	360	—	—	—	—
Hunting-Clan African Airways, Salisbury	62	5	2,605	397	12,420	—	324 tons 450,313 t.-m.	450,313	—	—
TUNISIA										
Tunis Air, Tunis	195	8	5,600	1,234	95,796	42,635	980 tons	4,659,280	72	—
UNION OF S. AFRICA										
South African Airways, Johannesburg	2,730	63	37,644	8,183	303,053	259,008	4,033 tons 6,797,596 t.-m.	32,134,468	55	21,330
AMERICA (NORTH)										
CANADA										
Canadian Pacific Air Lines, Vancouver	2,791	68	43,755	12,826	250,475	362,887	6,901,262 t.-m.	43,690,337	59.9	15,654
Leavens Bros., Toronto	108	3	—	52	1,937	73	2,545 t.-m.	—	—	—
Matane Air Services, Matane	23	4	234	210	19,393	1,034	—	—	—	—
Pacific Western Airlines, Vancouver	551	66	6,730	6,131	128,881	—	5,034 tons	—	—	—
Trans-Canada Air Lines, Montreal	10,513	347	31,544	49,536	2,785,523	1,625,689	23,158 tons 23,264,573 t.-m.	185,516,382	59.8	30,977
U.S.A.										
Alaska Coastal Airlines, Juneau	—	—	—	940	51,475	4,610	1,101 tons 97,895 t.-m.	—	—	—
Allegheny Airlines, Washington	931	74	2,154	6,343	488,615	84,196	3,876 tons 640,181 t.-m.	8,639,181	47.6	9,279
Aloha Airlines, Honolulu	323	14	—	1,579	199,227	24,781	110,624 t.-m.	2,092,048	56.2	—

Notes.—* Fleet details are given in the Airline Guide section. † All tons are short tons (2,000 lb.). ‡ Scheduled services only.

World Airline Statistics—1958 . . . .

	As at June 30, 1959*			Revenue miles flown (thous.)	Revenue passengers carried	Revenue passenger miles (thous.)	Freight and mail, tons and ton-miles†	Total revenue, ton-miles†	Average overall load factor achieved	Ton-miles† produced per employee
	Employees	Aircraft capts.	Unduplicated route mileage						%	
U.S.A.—*Contd.*										
American Airlines, New York	22,538	920	14,938	134,410	7,809,000	5,021,364	140,052 tons 124,417,000 t.-m.	606,574,000	65.6	—
Bonanza Airlines, Las Vegas	455	39	2,690	4,047	182,086	42,336	1,004 tons 217,929 t.-m.	4,238,219	49.8	21,330
Braniff International Airways, Dallas	5,157	218	14,618	38,668	2,136,649	1,001,875	26,159 tons	14,164,292	57.95	—
Central Airlines, Fort Worth	498	48	3,606	3,739	138,090	26,873	208,200 t.-m.	2,780,000	34.4	19,724
Chicago Helicopter Airways, Chicago	167	16	362	696	108,911	1,990	447 tons 17,614 t.-m.	207,574	28.5	4,827
Continental Air Lines, Denver	1,763	—	—	16,734	853,931	422,464	7,495 tons 3,718,911 t.-m.	—	—	—
Delta Air Lines, Atlanta	7,709	301	11,385	44,621	2,825,631	1,467,934	41,001 tons 21,377,184 t.-m.	165,071,000	53.2	51,256
Eastern Air Lines, New York ‡	16,365	—	—	121,500	7,266,864	4,270,000	35,500,000 t.-m.	445,000,000	49	—
Flying Tiger Line, Burbank	1,351	—	—	4,670‡	—	—	69,000,000 t.-m.‡	—	79.9‡	—
Frontier Airlines, Denver	1,179	89	6,300	6,181	231,935	62,704	2,666 tons 903,389 t.-m.	7,036,527	56.9	17,855
Hawaiian Airlines, Honolulu	741	30	412	3,307	437,229	88,043	10,533 tons 1,557,431 t.-m.	9,172,730	62.4	15,390
Lake Central Airlines, Indianapolis	442	40	1,961	29,064	181,778	3,051	—	—	41	—
National Airlines, Miami §	4,057	—	—	29,319	1,801,000	1,150,883	12,106,000 t.-m.	124,291,000	—	—
New York Airways, New York	226	17	246	404	91,114	1,761	2,116 tons	202,610	44.6	2,259
North Central Airlines, Minneapolis	1,733	—	5,228	11,261	777,140	117,574	708,607 t.-m.	12,792,316	47.3	—
Northeast Airlines, Boston ‡	2,410	—	—	15,080	955,955	407,116	—	41,890,682	39	—
Northern Consolidated Airlines, Anchorage	180	9	3,288	1,344	24,723	6,928	3,238 tons 988,878 t.-m.	1,749,888	61.3	11,289
Northwest Airlines, St. Paul	7,100	300	17,948	39,113	1,827,129	1,408,743	41,147,955 t.-m.	181,678,064	52.82	49,850
Pacific Northern Airlines, Seattle	655	25	3,900	4,098	131,892	105,595	5,492 tons 4,449,744 t.-m.	15,937,354	61	26,300
Pan American World Airways, New York	21,370	554	69,921	104,000	2,899,000	3,893,000	142,000,000 t.-m.	535,000,000	62 8	40,000
Pan American-Grace Airways, New York	1,359	40	5,344	5,609	128,776	163,351	6,351,565 t.-m.	23,883,977	57.1	—
Riddle Airlines, Miami	363	35	—	11,823	—	—	26,598 tons 68,235,100 t.-m.	68,235,100	87.9	—
Seaboard and Western Airlines, New York	886	—	—	3,170‡	—	—	15,200,000 t.-m.‡	—	41.4‡	—
Southeast Airlines, Kingsport	—	13	773	1,198	43,854	8,987	—	—	35.7	—
Trans World Airlines, Kansas City	17,624	635	48,000	117,753	4,753,000	4,592,675	72,136,000 t.-m.	514,289,000	57.1	28,570
United Air Lines, Chicago	21,000	800	14,000	135,514	7,276,000	5,213,856	122,000 tons 111,825,000 t.-m.	614,271,000	57.8	53,000
West Coast Airline, Seattle	625	25	2,273	4,104	248,436	46,521	160,543 t.-m.	4,634,051	45.8	7,868
Western Air Lines, Los Angeles	2,716	87	8,846	16,449	970,498	533,443	8,010 tons 5,309,000 t.-m.	56,710,000	—	—
AMERICA (CENTRAL AND SOUTH)										
ARGENTINA										
Aerolineas Argentinas, Buenos Aires‡	5,930	—	—	14,550	475,375	309,000	5,850,000 t.-m.	37,600,000	64.5	—
Austral, Buenos Aires	192	8	1,986	758	15,966	20,317	189 tons	14,365,123	—	—
Lade, Buenos Aires	128	—	5,340	925	19,414	11,000	—	1,145,000	—	6,800
BAHAMAS										
Bahamas Airways, Nassau	189	14	6,602	860	50,117	4,993	—	—	46	—
BOLIVIA										
Lloyd Aereo Boliviano, Cochabamba	938	24	8,304	2,157	146,267	23,978	2 924,989 t.-m.	5,579,280	—	—
BRAZIL										
Cruzeiro do Sul, Rio de Janeiro	4,050	—	—	12,500	467,371	195,000	8,000,000 t.-m.	24,800,000	61.1	—
Panair do Brasil, Rio de Janeiro	4,535	—	—	13,100	323,312	294,000	7,650,000 t.-m.	35,600,000	43.3	—
Real Aerovias, Sao Paulo	6,705	—	—	26,500	2,011,270	468,000	11,900,000 t.-m.	52,500 000	59.1	—
Varig, Porto Alegre	4,229	112	18,150	12,800	533,246	244,000	11,450,000 t.-m.	35,000,000	63	—
VASP, Sao Paulo	1,717	68	12,091	7,574	511,351	136,716	1,404,948 t.-m.	13,227,677	58.3	13,214
BRITISH WEST INDIES										
British West Indian Airways, Port of Spain	1,130	40	9,444	4,612	150,535	65,781	959,776 t.-m.	7,730,115	49.7	6,843
CHILE										
LAN-Chile, Santiago	1,615	—	—	5,170	290,388	155,000	2,315,000 t.-m.	17,650,000	66.9	—
COLOMBIA										
Avianca, Bogota ‡	5,280	—	—	15,700	1,083,382	328,000	21,200,000 t.-m.	54,500,000	60.3	—

Notes.—* Fleet details are given in the Airline Guide section. † All tons are short tons (2,000 lb.). ‡ Scheduled services only. § Fiscal year ended June 30, 1959.

FOR ITS FUTURE DEVELOPMENT POSSIBILITIES...

The ENGLISH ELECTRIC Lightning is one of the most advanced fighters in the world. Even so the basic design has further great potential development—not only in performance, but also in adaptation to other operational roles. This built-in stretch offers economies of production and operation as well as ensuring that, tactically speaking, it can be adapted to meet any situation which may arise.

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Freeze up

Low temperature lowers activity in all sorts of things; the flow of bees from the hive slows down, the engine oil in the car flows more slowly. It's just as true in aviation. For this reason much AIR BP research activity has been devoted to low temperature performance of aviation fuel—towards the prevention of icing troubles and the preservation of perfect pumpability at the deep-freeze levels around 50,000 feet altitude.

Water separation equipment has achieved the first end, and the free water content of BP fuels as delivered is no higher than 30 parts per million.

Precisely judged refining has likewise established that BP aviation fuels remain fluid at temperatures far below those encountered in service.

AIR BP

THE AVIATION SERVICE OF BRITISH PETROLEUM

World Airline Statistics—1958 . . . .

	As at June 30, 1959*			Revenue miles flown (thous.)	Revenue passengers carried	Revenue passenger miles (thous.)	Freight and mail, tons and ton-miles†	Total revenue, ton-miles†	Average overall load factor achieved	Ton-miles† produced per employee
	Employees	Aircraft capts.	Unduplicated route mileage						%	
CUBA										
Cubana, Havana	1,200	48	10,681	4,983	337,416	166,402	1,270,435 t.-m.	17,302,838	57.2	—
EL SALVADOR										
TACA International, New Orleans	—	23	2,727	—	59,190	—	4,202 tons	—	—	—
HONDURAS										
SAHSA, Tegucigalpa	240	10	—	634	89,496	56,773	5,777 tons	—	—	—
MEXICO										
Aeronaves de Mexico, Mexico City ‡	1,980	—	—	6,900	376,763	225,000	2,640,000 t.-m.	25,800,000	63.7	—
Guest Aerovias, Mexico City	360	—	—	1,300	34,495	46,500	810,000 t.-m.	5,850,000	49.7	—
Mexicana, Mexico City	3,302	137	7,410	15,056	566,432	370,221	19,359 tons 11,620,000 t.-m.	47,546,117	54.5	2,205
Trans Mar de Cortes, La Paz	198	6	2,880	847	31,334	12,043	485,147 t.-m.	—	—	—
PANAMA										
COPA, Panama City	65	5	745	357	37,332	—	1,434 tons	—	—	—
PUERTO RICO										
Caribair, Santurce	295	15	578	1,064	253,712	17,675	43,201 t.-m.	1,913,433	64.8	—
VENEZUELA										
Avensa, Caracas	1,194	43	7,449	6,412	398,326	99,479	10,022 tons 11,187,047 t.-m.	45,115,000	42.3	—
Linea Aeropostal Venezolana, Caracas ‡	2,090	—	—	9,400	361,565	127,000	7,050,000 t.-m.	20,050,000	37.7	—
ASIA										
BORNEO										
Borneo Airways, Labuan	—	—	—	371	24,237	2,169	50,345 t.-m.	183,416	—	—
CEYLON										
Air Ceylon, Colombo	322	5	8,776	1,295	56,139	28,400	14,338 tons 936,053 t.-m.	6,911,897	47.9	9,173
INDIA										
Air-India International, Bombay	4,537	44	25,166	6,805	81,209	246,956	2,720 tons 10,152,000 t.-m.	34,490,000	57.3	13,782
Indian Airlines Corporation, Delhi ‡	9,418	—	—	17,800	615,547	291,000	17,800,000 t.-m.	46,300,000	70.6	11,100
INDO-CHINA										
Air Vietnam, Saigon	752	7	12,150	1,363	93,825	32,400	750,000 t.-m.	5,300,000	66	—
INDONESIA										
Garuda Indonesian Airways, Djakarta	4,004	46	25,000	5,750	279,953	—	7,100 tons 3,1E0,000 t.-m.	16,350,000	85.8	4,850
IRAQ										
Iraqi Airways, Baghdad	730	—	—	1,525	79,067	29,800	390,000 t.-m.	3,160,000	53.1	—
ISRAEL										
El Al Israel Airlines, Tel-Aviv ‡	1,570	—	—	3,540	66,191	160,000	3,780,000 t.-m.	19,600,000	60.4	—
JAPAN										
Japan Air Lines, Tokyo	2,300	—	28,272	10,930	454,744	406,526	9,430,950 t.-m.	45,800,000‡	65.2	44,200
All Nippon Airways, Tokyo	580	36	7,000	3,840	172,220	—	—	—	—	—
JORDAN										
Air Jordan, Amman	176	6	4,696	523	29,949	10,661	165,821 t.-m.	1,185,855	47.7	14,150
LEBANON										
Air Liban, Beirut	495	15	10 800	1,900	56,279	39,200	1,260,000 t.-m.	5,330,000	44.0	—
Middle East Airlines, Beirut	1,026	31	33,919	5,125	97,706	68,837	3,439 tons 1,196,000 t.-m.	13,181,000	45	26,644
PAKISTAN										
Pakistan International Airlines, Karachi	3,611	—	13,443	5,051	206,918	142,251	4,049,614 t.-m.	16,413,969	52	—
PERSIA										
Iranian Airways, Teheran‡	617	34	12,490	1,905	79,542	23,491	970,856 t.-m.	3,360,286	41.5	25,446
PHILIPPINES										
Philippine Air Lines, Manila	2,100	60	—	6,837	502,651	116,398	—	—	63.8	—
SINGAPORE										
Malayan Airways, Singapore	1,285	32	7,706	3,082	139,784	37,305	1,250,000 t.-m.	4,480,000	56	6,170
AUSTRALASIA										
AUSTRALIA										
Ansett/A.N.A., Melbourne	3,779	126	15,558	13,911	785,928	358,576	32,931 tons 17,529,025 t.-m.	54,571,490	61.1	24,404
Connellan Airways, Alice Springs	38	9	10,570	461	1,926	709	108 tons 46,371 t.-m.	117,280	56.9	—
East-West Airlines, Tamworth	132	16	4,658	—	88,819	19,474	752 tons	—	—	—
Guinea Airways, Adelaide	—	9	2,284	—	91,667	14,875	1,509 tons 257,322 t.-m.	—	57.1	—
Qantas Empire Airways, Sydney	6,426	131	81,670	15,998	164,478	473,302	23,010,000 t.-m.	73,310,308	56.4	20,707
Queensland Airlines, Brisbane	39	8	1,784	997	43,974	—	980 tons	—	—	—
Trans-Australia Airlines, Melbourne	3,824	178	29,647	16,516	851,422	415,429	20,000 tons 10,532,249 t.-m.	51,704,727	65.4	19,750

Notes.—* Fleet details are given in the Airline Guide section. † All tons are short tons (2,000 lb.). ‡ Scheduled services only.

World Airline Statistics—1958 . . . .

	As at June 30, 1959*			Revenue miles flown (thous.)	Revenue passengers carried	Revenue passenger miles (thous.)	Freight and mail, tons and ton-miles†	Total revenue, ton-miles†	Average overall load factor achieved	Ton-miles† produced per employee
	Employees	Aircraft capts.	Unduplicated route mileage						%	
FIJI										
Fiji Airways, Suva	55	5	—	395	20,632	1,837	215 tons 20,378 t.-m.	180,524	68.5	4,949
NEW GUINEA										
Mandated Airlines, Lae	39	8	1,470	883	38,155	—	5,456 tons	—	—	—
NEW ZEALAND										
New Zealand National Airways, Wellington	1,738	74	3,459	7,368	558,068	147,081	3,860,000 t.-m.	18,455,000	75.2	14,329
Tasman Empire Airways, Auckland	875	16	10,022	2,355	66,629	90,282	927 tons 1,232,286 t.-m.	10,532,010	71.6	21,633
EUROPE										
AUSTRIA										
Austrian Airlines, Vienna	317	12	6,200	1,700	28,351	—	—	—	25.2	—
BELGIUM										
Sabena, Brussels	10,942	188	130,000	27,700	954,630	800,000	26,200,000 t.-m.	110,000,000	69.0	—
FINLAND										
Finnair, Helsinki	1,200	48	10,795	6,077	401,721	109,497	3,432 tons 1,320,748 t.-m.	11,989,657	46.1	21,974
Kar-Air, Helsinki	164	10	890	1,146	46,884	27,459	227 tons 139,913 t.-m.	573,640‡	45.4	—
FRANCE										
Air France, Paris	20,760	356	194,000	54,416	2,454,500	2,017,660	81,855 tons 65,447,000 t.-m.	284,000,000	66.0	34,930
Union Aéromaritime, Paris	2,500	39	76,000	8,700	164,728	231,000	13,700,000 t.-m.	37,000,000	66.5	—
GERMANY										
Lufthansa, Cologne	6,960	119	57,700	14,500	550,114	410,000	8,550 tons 11,450,000 t.-m.	55,400,000	51.0	17,800
GREECE										
Olympic Airways, Athens	1,200	—	5,225	3,920	314,712	86,700	1,415,000 t.-m.	10,550,000	48.1	—
HUNGARY										
Malev, Budapest	—	—	6,600	2,040	112,964	—	460,000 t.-m.	2,770,000	57.9	—
ICELAND										
Icelandair, Reykjavik	270	24	—	915§	80,400	18,700§	2,400 tons 386,000 t.-m.§	2,415,000§	59.5	—
Icelandic Airlines, Reykjavik	272	18	—	1,970	26,702	82,000	624,000 t.-m.	8,800,000	67.7	—
IRELAND										
Aer Lingus, Dublin	1,994	52	7,855	4,315	460,465	118,788	7,339 tons 1,596,347 t.-m.	12,167,453	63.0	13,400
Aerlinte, Dublin	92	—	3,072	1,108	11,991	37,255	89 tons 277,632 t.-m.	3,806,554	32.0	—
ITALY										
Alitalia-L.A.I., Rome	4,480	119	73,679	17,121	657,146	471,948	10,415 tons 9,397,932 t.-m.	56,392,301	52.3	15,289
NETHERLANDS										
K.L.M., The Hague	17,000	—	165,000	43,200	941,000	1,322,900	28,676 tons 48,900,000 t.-m.	191,400,000	57.6	19,821
POLAND										
LOT, Warsaw	—	40	8,800	3,400	131,710	46,400	1,820 tons 8,550,000 t.-m.	52,700,000	62.8	—
PORTUGAL										
T.A.P., Lisbon ‡	1,009	—	—	2,340	64,553	76,500	1,210,000 t.-m.	9,170,000	47.0	—
SCANDINAVIA										
Linjeflyg, Stockholm	303	35	3,350	2,190	138,040	23,574	4,908,708 t.-m.	—	59.7	19,884
S.A.S., Stockholm ‡	12,147	—	—	38,600	1,525,413	1,155,000	28,000,000 t.-m.	142,500,000	51.4	—
SPAIN										
Iberia, Madrid ‡	3,020	—	—	11,900	748,741	336,000	3,540,000 t.-m.	36,400,000	58.2	—
SWITZERLAND										
Swissair, Zurich	5,165	—	75,277	20,552	857,673	632,171	18,659,524 t.-m.	84,310,691	60.1	27,150
UNITED KINGDOM										
Airwork Group, London	923	83	19,609	12,550	209,082	399,379	32,326 tons 23,379,887 t.-m.	62,515,186	88.4	39,911
British European Airways, London	11,804	432	32,271	35,380	2,760,147	961,242	34,329 tons 15,106,729 t.-m.	105,487,000	60.1	15,391
British Overseas Airways, London	18,927	363	81,294	39,874	465,263	1,422,235	54,075,612 t.-m.	197 030,416	57.3	18,065
Cambrian Airways, Cardiff	—	—	—	1,056	50,797	8,175	5,497 t.-m.	855,807	—	—
Eagle Airways, London	494a	25a	5,173	645	22,171	—	55 tons 31,113 t.-m.	1,224,178	48.7	—
Hunting-Clan Air Transport, London	463	44	26,455b	3,073	44,463	67,700	1,116 tons 3,971,945 t.-m.	11,003,552	70.0	—
Scottish Airlines, Prestwick	—	—	—	462	14,800	1,759	598 tons	1,929,000	—	—
Silver City Airways, London	—	—	—	5,240	339,600	126,117	81,230 tons 4,433,271 t.-m.	16,698,780	69.2	23,937

Notes.—* Fleet details are given in the Airline Guide section. † All tons are short tons (2,000 lb.). ‡ Scheduled services only. § International traffic only. *a* Include Eagle Aviation. *b* Includes Africargo.

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Guide to the World's Airlines

On this and the following pages are information summaries for the World's scheduled airline operators. Each entry gives, where possible, history, composition, operation, fleet and management details. The entries are arranged in alphabetical order by continent, country and operators' names. Traffic statistics for 1958 *are on the previous four pages*

AFRICA

ALGERIA

Air Algérie.—46 Boulevard Saint-Saens, Algiers, and 6 rue Auber, Paris, 9e.

Cie. Générale de Transportes Aériens Air Algérie was formed from a merger, in May, 1953, of Air Transport and the original Air Algérie, which were themselves formed in 1946 and 1947 respectively. Air Algérie is the air transport affiliate of Cie. Générale Transatlantique and Cie. de Navigation Mixte. The fleet consists of two Constellations, nine DC-4s, three DC-3s and three Noratlas. Four Caravelles are on order.

President and director-general, M. J. Richard Deshais; director and vice-pres., Col. J. Soufflet; director for Algiers, Col. H. Alias.

BELGIAN CONGO

Air Bronsse.—P.O. Box 503, Luluabourg.

This new airline operates local services from Luluabourg and Leopoldville, using D.H. Rapide and Piper Pacer aircraft.

Sobelair (Société Belge de Transports par Air, S.A.).—137 Rue Royale, Brussels.

Flying Cessna 310s, this company operates local services in the Belgian Congo, flying services from Elizabethville and Stanleyville.

BRITISH WEST AFRICA

Nigerian Airways—WAAC (Nigeria), Ltd.—Airways House, 161 Broad Street, Marina (P.O. Box 136), Lagos, Nigeria.

The original W.A.A.C. ceased to exist last year following the independent status of Ghana and the formation of Ghana Airways. It was formed in 1946 and started operations in 1947. Debentures were held by Nigeria, Sierra Leone and the Gold Coast (now Ghana).

The new company, WAAC (Nigeria), or Nigerian Airways, came into being on October 1, 1958, and has a 15-year agreement with B.O.A.C. whose Britannias are used to operate London-Lagos services in pool. The Nigerian Government holds 51% of the capital with Elder Dempster holding 32½% and B.O.A.C. the remainder. The fleet consists of eight D.H. Herons, one D.H. Dove and seven DC-3s.

Chairman, R. W. C. Baker Beall, C.B.E.; general manager, D. Malcolm Brown; chief engineer, R. R. R. Allen, B.E.M.; chief of flight operations, Capt. L. V. Messenger; traffic manager, J. P. S. Bailey.

Sierra Leone Airways.—22 Pultney Street, Freetown, Sierra Leone.

The operations of Sierra Leone Airways were started by W.A.A.C. in 1958 to provide local services and a connection between Freetown's airport and the capital on the other side of the river. They are continued by Nigerian Airways. A D.H. Rapide is used.

EGYPT

Misrair, S.A.E.—Cairo Airport, Heliopolis.

Formed as Misr Airwork in May, 1932, this operator's present name was adopted in 1949 and it is now wholly owned by Egyptians. Misrair operates services from Cairo, Alexandria and Damascus to Beirut, Baghdad, Kuwait, Khartoum, Jedda, Asmara, Jerusalem, Benghazi, Tripoli, Athens, Rome, Zurich, Geneva and Frankfurt. The fleet at mid-1959 consisted of four Viscounts, six Vikings, four DC-3s and one Beech D.185. Three Viscounts were on order.

Chairman, Air Marshal Mohamed Sidky Mahmoud; managing director, A.V.M. Hassan Mahmoud; general manager, Air Cdre. Mahmoud Sidky El-Miligi.

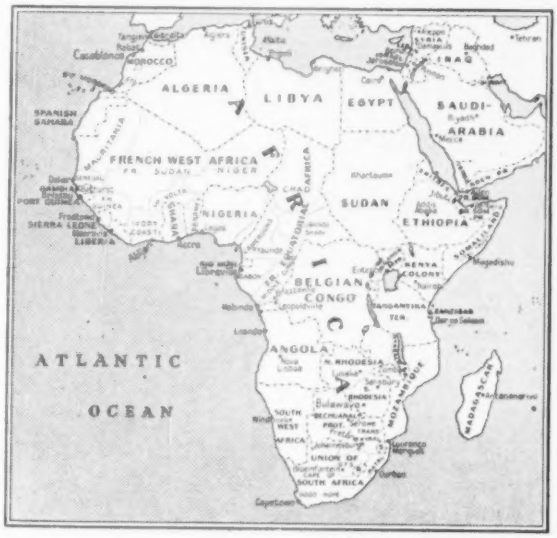
ETHIOPIA

Ethiopian Air Lines, Inc.—P.O. Box 1755, Addis Ababa.

Owned by the Ethiopian Government and managed by Trans World Airlines under contract, this carrier was formed in 1946. Ethiopian flies over an internal network and to external points including Frankfurt, Khartoum, Port Sudan, Aden, Dibouti, Athens, Cairo and Nairobi.

The aircraft fleet at the end of 1958 consisted of three DC-6Bs, three Convair 240s, eight DC-3s and five Bell helicopters.

President, H. E. Dejazmateh Mangashia Seyoum; general manager, V. H. Harrell, Jr.; general operations manager, H. F. Noon; general sales manager, D. P. Reid; secretary-treasurer, M. F. Garrison.



Modified "Geographia" map.

FRENCH EQUATORIAL AFRICA

Transportes Aériens du Gabon.—P.O. Box 161, Libreville, Gabon.

Starting in 1953 on charter operations, this carrier flies scheduled local services from Libreville. The fleet consists of four D.H. Rapides, four Cessna 170Bs, two Autocrats and one Proctor 5.

FRENCH WEST AFRICA

Aéromaritime. — Blvd. Colonel Leclerc (P.O.B. 136), Douala, Cameroons.

See Union Aéromaritime de Transport, under Europe, France.

Air Ivoire.—Avenue Louis-Barthe (P.O.B. 1281), Abidjan.

This carrier was established by Transports Aériens Intercontinentaux (which see, under France) in 1956 to operate local services. The fleet consists of D.H. Rapides.

GHANA

Ghana Airways, Ltd. — Ghana House, P.O. Box 1636, Accra.

Formed on July 4, 1958, as the national airline, Ghana Airways started operations in October of last year. The Government holds 60% of the share capital, with the remaining 40% held by B.O.A.C. Associated Companies. Services are operated within Ghana and to Nigeria, the Ivory Coast, Liberia, Sierra Leone, Gambia and Senegal. A twice-weekly London service (via Barcelona, or Tripoli and Rome) is operated with Britannias on charter from B.O.A.C. At mid-1959 the fleet consisted of

A South African Airways Viscount 813 with Cape Town in the background.

Guide to the World's Airlines . . . .

two DC-3s and two D.H. Herons.

Chairman, James Mercer; general manager, Capt. G. P. Wood; dep. general manager, L. C. Giles; chief pilot, Capt. C. B. Gavin-Robinson; chief engineer, J. C. Williams.

KENYA

Caspair, Ltd.—(P.O. Box 2238), Nairobi West and Plant House, Nairobi.

Primarily a charter operator and aircraft maintenance company, Caspair is associated with East African Airways and flies scheduled services round Lake Victoria from Entebbe, Uganda. It is a subsidiary of Campling Brothers and Vanderwal, Ltd. The fleet at mid-1959 consisted of three D.H. Rapides, one Cessna 182, one Bonanza and one Piper Cub.

Directors: L. K. Campling, F. K. Campling and H. Vanderwal.

East African Airways Corporation.—Airways Terminal, Sadler Street, Nairobi.

E.A.A.C. is Government sponsored, with certain guaranteed overdraft facilities and with B.O.A.C. acting as technical advisers. It was formed in 1946 to continue and to expand the operations of the pre-War Wilson Airways and to provide air services between Kenya, Uganda, Tanganyika and Zanzibar.

The Corporation also operates, via Lourenço Marques or Salisbury, to Durban, and now to the U.K. and to Aden, Karachi and Bombay. At mid-year the fleet consisted of three DC-4Ms, nine DC-3s and four D.H. Rapides. Two D.H. Comet 4s are on order.

Chairman, Sir Alfred Vincent; general manager, Col. M. C. P. Mostert, O.B.E.; secretary and asst. general manager, A. V. Gill, O.B.E.; operations manager, Capt. E. E. Morris, M.V.O.; sales manager, Capt. P. A. Travers; engineering and supplies manager, A. E. Robinson, B.E.M.; stations and traffic manager, A. G. Molison; chief accountant, S. G. Choppin.

LIBERIA

Liberian National Airways.—Robertsfield, Liberia.

Entirely Government-owned, this carrier operates local services in Liberia. It was formed in December, 1949. The fleet consists of two DC-3s.

President, F. H. Sypbert.

LIBYA

Libiavia—Nord Africa Aviazone.—218 Gladdat Istiklal (P.O.B. 245), Tripoli.

Libiavia operates between Tripoli, Athens and Ankara with leased DC-6Bs.

MADAGASCAR

Air Madagascar.—8 Rue Général Roques (P.O. Box 437), Tananarive.

Founded in 1947, this company flies local services. The fleet consists of six D.H. Rapides, three DC-3s, one Broussard MH.1521 and one Cessna 170.

President, Gen. G. Fayet; director général, Michel Vernier; adjutant director général, Roland Garros; technical director, J. Lossignol; chief pilot, L. Meyer.

MOROCCO

Royal Air Maroc.—5 Avenue de l'Armée Royale, Casablanca.

Royal Air Maroc was known until 1957 as Compagnie Chérifienne des Transports Aériens, which was itself formed from a merger of Air Atlas and Air Maroc. After independence Morocco instituted this national company. It operates services in the North African area, to points in France, Spain and Switzerland, and to Dakar and Gibraltar. Future services will extend towards Germany, Portugal and other European countries. At June 30, 1959, the fleet consisted of one Lockheed Constellation, four DC-4s and two DC-3s. A Caravelle will be in service next April.

President, Mohamed Laraki; director general, André Faurous; financial director, Philippe Valent; commercial director, Mohamed Amine Benjelloun; technical manager, M. Delluc.

PORTUGUESE EAST AFRICA

Direcçao de Exploraçao dos Transportes Aéreos (DETA).—Avenida do General Machado, 2-28 (P.O. Box 276), Lourenço Marques, 1, Moçambique.

Formed in 1936, DETA operates domestically within Moçambique and with international services from Lourenço Marques to Johannesburg, Durban and Salisbury. It is a Government enterprise. The fleet consists of five DC-3s, three Lodestars, four D.H. Doves and two Ju-52s.

Director-general, H. A. Brazao de Freitas; director, Lt.-Col. A. da Silva Paes; sub-director, Eng. Abel Neves de Azevedo.

PORTUGUESE WEST AFRICA

Divisao des Transportes Aéreos (D.T.A.).—Carvalho and Freitas Building, Rua Pereira Forjaz (P.O. Box 79), Luanda, Angola.

Formed in 1938, this is a Government-controlled undertaking. Flying operations started in 1940. D.T.A. operates internal services in Angola and flies also to Leopoldville and Pointe Noire. The fleet consists of six DC-3s, four Beech 18s and three D.H.89s.

President, Eng. P. Jeite; managing director, Jacinto de Silva Medina.

Serviço de Transportes Aéreos.—The Airport, Sao Tomé Island, Gulf of Guinea.

This carrier operates services between the islands of Sao Tomé and Principe. The fleet consists of two D.H. Rapides and six single-engined aircraft.

Chief executive, V. C. Cortes.

Transportes Aéreos da Guiné Portuguesa.—Craverio Lopes Airport (P.O. Box 77), Bissau, Portuguese Guinea.

This operator flies local services between Praia, Dakar and Bissau, connecting with the long-haul services at Dakar and with Union Aéromaritime's services in the area. The fleet consists of D.H. Herons.

Chief pilot, Manuel da Silva Gravato.

RHODESIA AND NYASALAND

Central African Airways Corporation.—Salisbury Airport, Salisbury, Southern Rhodesia.

C.A.A. is the national airline of the Federation and was formed in 1946. It provides services within the Federation and to contiguous areas such as the Belgian Congo, Moçambique and South and East Africa. As a partner in pool with South African Airways and B.O.A.C. the latter operates Britannia 312s on its behalf between the Federation and London. A coach-class service, known as the "Zambesi Viscount," is operated between London and the Federation. At mid-1959, the fleet consisted of four Viscounts, five DC-3s and five Beavers.

Chairman, A. E. Robinson; general manager, Max Stuart-Shaw; asst. general manager, R. P. Hartley; engineering manager, K. H. Greager, M.B.E.; chief accountant, W. B. James; operations manager, M. O'Donovan; traffic and sales manager, G. C. Draper; planning manager, W. L. Stedman.

Commercial Air Services (Rhodesia) (Pvt.), Ltd.—P.O. Box 632, Bulawayo, Southern Rhodesia.

This company was formed in 1946 as a subsidiary of C.A.S. of Johannesburg, which held a 51% interest. In 1956 this holding was acquired jointly by Airwork and Anglo Transvaal Industries. The majority of operations are non-scheduled, but in 1956 and 1957 local feeder services were operated for Central African Airways and on November 1, this year, these services were taken over. The fleet consists of one Cessna 310, two Cessna 180s and two Cessna 195s.

Managing director, D. A. Eardley; secretary, Mrs. S. M. Eardley; chief pilot, K. W. Brown; chief engineer, W. D. Gardyne.

Hunting-Clan African Airways (Pvt.), Ltd.—Salisbury Airport, Salisbury, Southern Rhodesia. (Pte. Bag 179H, Salisbury, S.R.)

Established in February, 1955, as a subsidiary of Hunting-Clan Air Holdings. All-cargo services are operated as extensions of H.-C.A.'s Africargo services and passenger/cargo services to points such as Livingstone, Kariba, Lusaka, Abercorn and (holiday services) from Salisbury and Johannesburg to the Moçambique coast. The fleet consists of two DC-3s.

Director and general manager, T. P. Lawler; secretary, D. T. Shaw; chief pilot, Capt. Clive Halse; commercial manager, Keith Vorster; chief engineer, H. Hersey.

SOUTH WEST AFRICA

South West Air Transport (Pty.), Ltd.—The Airport (P.O. Box 731), Windhoek.

Formed in 1946, South West was licensed for scheduled and non-scheduled services in 1948. It is a private company which is subsidized by the South West Africa Administration. In July, 1959, it was merged with Oryx Aviation. The fleet consists of seven Navions, seven Cessnas and two Apaches.

Chairman, P. H. M. du Plessis; managing director, G. T. Van Rooyen; chief engineer, A. K. L. Finke; operations manager, L. W. Theron; chief pilot, W. Schenck.

SUDAN

Sudan Airways.—P.O. Box 253, Khartoum.

Formed in 1947, Sudan Airways is a Government-owned airline operating domestic services and the "Blue Nile Viscount" service between Khartoum, Cairo, Athens, Rome and London. External services are also operated to Egypt, Lebanon, Aden, Ethiopia, Uganda and Saudi Arabia. The fleet consists of one Viscount 831, seven DC-3s and four D.H. Doves.

General manager, Abdel Bagi Mohamed; traffic manager, Yousif Bakheit Arabi; chief pilot, Capt. D. W. Graham; chief engineer, R. D. Collins.

TUNISIA

Tunis Air.—47 rue de Portugal, Tunis.

Formed in 1948 by Beylical Decree, 51% of Tunis Air's capital is held by the Tunisian Government and 49% by Air France. Operations were started in 1949. Scheduled services are flown within Tunisia and to Algeria, Corsica, France, Italy and Libya. The full name of the company is Société Tunisienne de l'Air. The fleet at mid-1958 consisted of three DC-3s and two DC-4s (one on lease).

President, Azedine Abbassi; director-general, Pierre F. Delaunay.

UNION OF SOUTH AFRICA

Commercial Air Services (Pty.), Ltd.—Balgownie House, Commissioner Street (P.O. Box 2245), Johannesburg, Transvaal.

Operating from Rand Airport, Germiston, this Airwork associate flies scheduled as well as unscheduled services. It was formed in 1943 and scheduled services were started in 1948. An associate operates from Bulawayo (see Rhodesia and Nyasaland). The fleet consists of two

(*Continued on page 473*)

One of Bonanza Air Lines' F-27As flying near the Hoover dam (See page 474).

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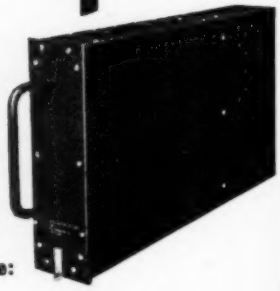

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(*Continued from page* 472)

Lockheed Lodestars and four Cessnas.

Director and operations manager, J. M. S. Martin; director and commercial manager, L. Zimmerman.

South African Airways.—Railway Headquarters, Johannesburg.

Owned by the Union Government, S.A.A. was formed in 1934. Its predecessor, Union Airways, started operations in 1929, and was taken over by the Railways Administration.

The trunk service to Europe is operated in conjunction with B.O.A.C. and C.A.A. and a service between Johannesburg and Perth, Western Australia, is flown in association with Qantas. S.A.A. also operates to Southern Rhodesia and Portuguese East Africa and operates a large network of domestic services linking the principal cities in the Union and South West Africa.

The fleet at mid-1959 consisted of four DC-7Bs, seven Viscount 813s, four L-749s, seven DC-4s and six DC-3s. Three 707s are on order.

General manager, D. H. C. du Plessis; chief executive, J. G. Grové; chief airways manager, J. D. T. Louw; asst. airways manager, J. Adam. Superintendents: administrative, D. Beaton; commercial, N. S. Louw; flying, A. J. Brink (acting); maintenance and servicing, W. B. Scott; aeronautical, F. W. Bailey; staff, J. J. Jessiman.

AMERICA
(North)

CANADA

Canadian Pacific Airlines, Ltd.—Vancouver Airport, British Columbia.

A wholly owned subsidiary of the Canadian Pacific Railway Company, CPAL was formed in 1942 from 10 bush lines, the best known of which was Canadian Airways in which the CPR had held a controlling interest since 1933. The CPR organization is privately financed. Within Canada, CPA's Britannias established a new transcontinental service on May 4, 1959, between Vancouver, Winnipeg, Toronto and Montreal.

Overseas, CPA serves Tokyo and Hong Kong, via the Aleutians, and Mexico, Peru, Argentina and Chile to the south. The Latin-American network extends from Mexico City to Toronto and Montreal, and across the Atlantic to Santa Maria, Lisbon and Madrid. The South Pacific service reaches Honolulu, Fiji, Auckland and Sydney, and connects at Vancouver with the polar route to Amsterdam.

The fleet consists of 10 DC-6Bs, six Britannia 314s, five Convairs, six DC-3s, two C-46s and one Canso. Two Britannia 324s will be in service shortly, and four DC-8s are on order.

President, G. W. G. McConachie; exec. vice-pres., R. W. Ryan; vice-pres., administration, R. B. Phillips; vice-pres., traffic, H. B. Renwick; general manager operations, H. D. Cameron; director of maintenance and engineering, J. A. Gillies; secretary, T. F. Turner; treasurer, H. B. Porteous; comptroller, J. C. Gilmer; senior solicitor, J. F. Clark; advertising manager, J. D. Roberts; asst. to president, public relations, R. A. Keith.

Leavens Bros., Ltd.—3220 Dufferin St., Toronto 19, Ontario.

This company was formed in 1927 as an operating partnership; was incorporated in 1932 as Leavens Bros. Air Services; and reorganized in 1953 under its present name. Scheduled services are operated between Windsor and Pelee Island.

The fleet consists of two Cessna T-50s.

President and general manager, C. R. Leavens; vice-pres., R. H. Leavens; secretary, C. D. Leavens.

Maritime Central Airways, Ltd.—Charlottetown, Prince Edward Island.

This private company was formed in 1941. Scheduled services are flown between points in Prince Edward Island, New Brunswick, Nova Scotia, Quebec, Newfoundland, Labrador and the Northwest Territories. International group charters are operated from bases at Toronto and Montreal.

The fleet consists of five DC-3s, two DC-4s, three C-46s, one amphibious Beaver, two Beech C-18s and one Viscount 805.

President, F. T. Briggs; vice-pres. and managing director, C. F. Burke; secretary-treasurer, A. M. Clark; operations manager, D. B. Simmons.

Matane Air Services, Ltd.—P.O. Box 700, Matane, Quebec.

Matane operates local scheduled services via intermediate points to Port Cartier (Shelter Bay) and Lac St. Anne. It was formed in 1947 to provide services across the St. Lawrence River at Matane, Quebec.

The fleet consists of one DC-3, four Lockheed 10A Electras and one Cessna T-50.

President, G. Burnett; chief engineer, J. G. Sirois; chief pilot, W. J. Anderson.

Modified "Geographia" map.

Nordair, Ltd.—Hangar No. 6, Montreal, Quebec Province.

This carrier operates services from Montreal to Quebec City, Roberval, Chibougamou, Port Chimo, Hopes Advance Bay and Frobisher Bay-Cape Dyer.

The fleet includes DC-4s, C-46s, DC-3s, PBY-5A Cansos, Norseman, Beaver and Husky F11.

Managing director, C. F. Burke; asst. managing director, J. F. Henley; exec. vice-pres., R. G. Lefrancois.

Pacific Western Airlines, Ltd.—Vancouver Airport, B.C.

Formerly Central B.C. Airways, Pacific Western was established in 1946 by the late Russell Baker. In 1955 Pacific Western purchased Queen Charlotte Airlines and Associated Airways, which now operates as an integral part of P.W.A.

The fleet consists of three DC-4s, six C-46s, five DC-3s, five Anson Vs, 21 D.H.C. 2 Beavers (the largest commercially operated Beaver fleet in the World), four D.H.C. Otters and three Cessna 180s.

Chairman, president and managing director, K. J. Springer; vice-pres. and general manager, R. H. Laidman; vice-pres. and controller, W. R. Harris; exec. vice-pres., D. D. McLaren; secretary-treasurer, D. F. Granger; Ass. general manager, D. Watson; director traffic research and development, H. G. Brandreth; personnel manager, C. G. Ballentine; maintenance manager, F. W. Coulter; traffic manager, G. J. Cooke; director of sales promotion, J. B. McGuire; and supt. of supply, R. W. Wilson.

Quebecair, Inc.—Rimouski, Quebec Province.

Formed as Rimouski Aviation Syndicate in 1946, this company was incorporated as Rimouski Airlines, Ltd., in 1947. At the beginning of 1953, Rimouski merged with Gulf Aviation and assumed its present name. Points served by Quebecair include Montreal, Quebec, Rimouski, Mont Joli, Matane and Forestville.

The fleet consists of three F-27s, three DC-3s, two PBY Cansos, one C-46 and one Beechcraft D-18.

President, Romeo Crevier; general manager, B. Ste-Marie; comptroller, L. Tardiff; maintenance supt., L. Lavigueur; traffic manager, A. Senecal.

Sarnia Airlines.—1972 London Road, Sarnia, Ontario.

Using D.H. Doves, Sarnia operates to Windsor, London (Ont.) and Toronto.

Saskatchewan Government Airways.—The Airport, Prince Albert (P.O. Box 850), Saskatchewan.

This is a Crown Corporation which was formed in 1947 by the Provincial Government to serve Northern Saskatchewan. Scheduled and non-scheduled services are flown as far north as Uranium City.

The fleet in 1958 consisted of two DC-3s, one Otter, four Norseman, five Beavers, nine Cessna 180s, one Cessna 170 and one Cessna 140.

General manager, I. Macleod; operations manager, F. R. Baudais; sales and traffic manager, M. W. Christie; chief engineer, J. A. Pool; chief accountant, B. Webb.

Control is vested in the Province's Minister of Natural Resources.

TransAir, Ltd.—No. 5 Hangar, Winnipeg Airport (P.O. Box No. 5), St. James, Manitoba.

TransAir was formed in 1956 as a result of the merger of Central Northern Airways and Arctic Wings.

The fleet in 1958 included a DC-3, a DC-4, a Lockheed 12A, four Consolidated PBY-5As, a York and assorted smaller aircraft.

President and managing director, R. D. Turner, Q.C.; asst. general manager, U. S. Wagner; manager, mainline division, J. G. Twist; secretary-treasurer, F. C. McKay.

Trans-Canada Air Lines.—International Aviation Building, 1080 University Street, Montreal, Quebec Province.

Canada's nationally owned airline, T.C.A., was incorporated by an Act of Parliament in April, 1937, to operate the Dominion's overseas and coast-to-coast services. North Atlantic services were started in 1943 and Caribbean services in 1948. All stock is held by the Canadian National Railways. T.C.A.'s routes serve 40 communities in Canada and 20 in the U.S., the U.K., Europe and Caribbean area.

T.C.A. was the first North American purchaser of British turboprop aircraft and the last of 50 Viscounts was put into service during 1958. Vanguards and DC-8s will be in service next year. The international route pattern was increased during 1958 to include Belgium and Switzerland; non-stop flights to Paris were also started.

The fleet consists of nine DC-3s, 21 Canadair North Stars, 13 L-1049s and 50 Viscounts. On order are 20 Vickers Vanguards and six DC-8s.

President, G. R. McGregor; vice-pres., operations, H. W. Seagrim; vice-pres., sales, W. G. Wood; secretary, R. H. Tarr; comptroller, W. S. Harvey; general manager, purchases and stores, H. C. Cotterell.

Wheeler Airlines, Ltd.—Montreal Airport, Quebec Province.

Wheeler was established in 1921, and became prime contractor for DEWline resupply in the Eastern Arctic in 1958. Wheeler also has a scheduled route from Montreal to Val D'Or, Quebec, and Great Whale, but charter work is its main occupation. The company is also engaged in transatlantic non-scheduled group charter and immigrant flying. The main base is now at Montreal Airport.

The fleet consists of four DC-4s, four C-46s, four DC-3s, three PBY Cansos, one Twin Beechcraft, two Otters, two Beavers, three Norseman, one Cessna 180, and a spray fleet of seven Stearmen and seven TBM Grumman Avengers.

President, F. H. Wheeler; managing director, R. Rychlicki; treasurer, James Lavery; vice-pres., Robert D. Forster; secretary, J. J. F. Bancroft; asst. secretary, G. Fitzgerald; asst. general manager, D. D. Mellish p.

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UNITED STATES

Aaxico Airlines, Inc.—P.O. Box 875, Miami 48, Florida.

Aaxico operates scheduled all-cargo services between New York and New Orleans, via Atlanta. The sales headquarters are at N.Y. International.

The fleet in 1958 consisted of 35 C-46s, one DC-6C and one DC-4.

President, Howard Korth; vice-pres. and general manager, J. G. Helvey; secretary and treasurer, E. P. Odenwalder.

Alaska Airlines, Inc.—2320 Sixth Avenue, Seattle 1, Washington.

This carrier first began operations in 1932 as McGee Airways and later became Star Air Lines. In 1942-43 the assets of Mirrow Air Services, Pollack Air Service and Lavery Airways were acquired and the present name was adopted in 1944. Alaska Airlines flies services between Seattle and Fairbanks, whence a network is flown within Alaska.

The fleet consists of three DC-6Cs, two DC-4s, three C-46s and 12 single-engined aircraft.

President and general manager, Charles F. Willis Jr.; vice-pres., R. W. Gilbert and L. H. Peterson; treasurer and comptroller, R. H. Hernstein.

Alaska Coastal Airlines.—2 Marine Way, Juneau, Alaska.

This airline serves south-eastern Alaska. It was formed in 1939 as a partnership between Alaska Air Transport and Marine Airways, both of which started in the 1930s.

At mid-1959 the fleet consisted of eight Grumman Goose, two Cansas, one Bellanca Pacemaker, one Cessna 195, three Cessna 180s and one Howard DGA 15-P.

Co-managers, S. B. Simmons and O. F. Benecke; general office and traffic manager, B. G. Olson; operations manager, H. S. Gruening.

Allegheny Airlines, Inc.—Washington National Airport, Washington 1, D.C.

Allegheny Airlines' predecessor was formed in 1937. Since 1949 it has operated scheduled services which now link Pennsylvania, the Ohio Valley and the eastern seaboard with New York, Philadelphia, Washington/Baltimore, Pittsburgh, Cleveland, Detroit and Buffalo.

The fleet consists of one (Eland) Convair 540, 13 Martin 202s and 12 DC-3s.

President, Leslie O. Barnes; sen. vice-pres., D. L. Miller; vice-pres., finance, Walter J. Short; vice-pres., flight and passenger service, R. G. Dinning; vice-pres., maintenance and engineering, Rocco J. Masiello.

Aloha Airlines, Inc.—King Street at Bethel, Honolulu, Hawaii.

Aloha Airlines (previously Trans-Pacific Airlines, Ltd.) began operations in 1946 and now operates between each of the major islands.

The fleet consists of three Fokker/Fairchild F-27s and seven DC-3s. Three more F-27s are on order.

Chairman, Ruddy F. Tongg; president, Dr. Hung Wo Ching; sen. vice-pres., David A. Benz; Admin. vice-pres., Kenneth F. C. Char; vice-pres., treasurer, Clarence D. Young; vice-pres., sales, Walton E. Wood; vice-pres., operations, Jack M. Brown; asst. vice-pres., public relations, E. Curtis Cluff Jr.; asst. vice-pres., passenger service, Osbuern McCraw; asst. vice-pres., sales, Clifford H. Bowman; director of flight operations, Olen V. Andrew.

American Airlines, Inc.—100 Park Avenue, New York 17, N.Y.

Founded in 1934, American Airlines succeeded American Airways, which had been formed in 1930 as an amalgamation of a dozen or more operators. American is the leader among the U.S. domestic operators and the size of the organization can be gauged from the fact that last year, despite a pilots' strike, American carried 7,809,000 passengers and flew a total of 5,021,364,000 passenger-miles. American's route system is mainly concerned with coast-to-coast operations, but stretches over most of the U.S. and north into Canada and south into Mexico; more than 450 flights are operated every day.

The fleet, at Sept. 1, 1959, consisted of 20 Boeing 707s, 20 Lockheed Electras, 33 DC-7s (including DC-7F Airfreighters), 23 DC-6Bs, 48 DC-6s, 43 Convair 240s and 10 DC-6A Airfreighters. American also has on order 30 more 707s (long and medium range), 15 Electras and 25 Convair 600s.

President, C. R. Smith; exec. vice-pres., finance, W. J. Hogan; exec. vice-pres., sales, C. A. Rheinstrom; exec. vice-pres., operations, O. M. Mosier; exec. vice-pres. and general counsel, G. A. Spater; sen. vice-pres. and secretary, C. W. Jacob; sen. vice-pres., sales, C. R. Speers. Vice-presidents: flight, W. B. Whitacre; purchase and stores, G. J. Brandewiede; equipment research, W. Littlewood; public relations, W. Player; cargo, S. C. Dunlap; technical services, F. C. Wiser; controller, L. E. Glasgow; personnel, P. W. Kayser; sales services, G. M. Sadler; properties and facilities, M. D. Kochman; regulatory proceedings, N. L. Smith. Treasurer, P. G. Larie.

Apache Airlines.—P.O.B. 11035, Municipal Airport, Tucson, Arizona.

Apache operates services with Bonanzas between Phoenix, Tucson and Fort Huachuca.

ASA International Airlines.—Pinellas International Airport, St. Petersburg 33, Florida.

This company (Aerovias Sud Americana, Inc.), was formed in 1947 as an irregular cargo carrier. In 1950, ASA was granted the first U.S. international all-cargo certificate.

The fleet consists of two C-46Fs and one DC-4B.

Chairman, Francis S. Buchanan; president, Victor V. Carmichael, Jr.; vice-pres. and general manager, William M. Dunn, Jr.; director of operations, F. A. Swensen; treasurer, J. M. Rodriguez; secretary, William M. Bussey.

Avalon Air Transport.—Municipal Airport, Long Beach, California.

Avalon flies a shuttle service between Long Beach and Avalon, Catalina Island.

The fleet in 1958 included six Goose and one Vought-Sikorsky 44A.

President, W. R. Probert; secretary-treasurer, W. B. von Kleinsmid.

Bonanza Air Lines, Inc.—McCarran Field, P.O. Box 391, Las Vegas, Nevada.

Formed in 1945, Bonanza operated as an intra-state scheduled carrier and charter operator until 1949, when it became a certificated carrier with routes in Nevada and Arizona, serving Reno and Las Vegas, Nevada and Phoenix, Arizona. Bonanza has since been certificated to serve two routes between Phoenix and Los Angeles, a route between Las Vegas and Los Angeles, and non-stop and all-stop services between Phoenix and Salt Lake City, Utah.

Six Fokker Fairchild F-27As and 10 DC-3s are in service.

President, Edmund Converse; exec. vice-pres., G. Robert Henry; vice-pres. operations, M. W. Reynolds; vice-pres. traffic and sales, W. J. Mitchell; treasurer, R. J. Sherer; asst. to president, Jack Arant; director of research and development, E. E. Jochim; asst. to exec. vice-pres., Donald Neilson; director of public affairs, Janice Thomas.

Braniff International Airways, Inc.—Exchange Park, Dallas 35, Texas.

Braniff Airways started airline operations in 1928, and the word "International" was added after services were extended, 20 years later, to include South America. Domestically, Braniff serves the central areas of the U.S. between Houston, Minneapolis and Chicago, between Denver and Memphis and between points in Texas, the mid-south, Washington, D.C., and New York. International services are flown as far south as Buenos Aires.

The fleet at mid-1959 consisted of three Lockheed Electras, six DC-7Cs, 10 DC-6s, two Constellations, 25 Convair 340s, six Convair 440s, 10 Douglas DC-3s, two C-46s (cargo) and one C-47 (cargo). Five Boeing 707 220s and six Electras are on order.

President, C. E. Beard; exec. vice-pres., J. W. Miller. Vice-presidents: finance, and secretary, C. G. Adams; purchasing and stores, Horace Bolding; traffic and sales, R. Brack; operations, Capt. R. V. Carleton; industrial, M. Harrison; public relations, W. M. Henshel; R. C. Shrader; Charles South. Treasurer, O. W. Crane.

Byerly Airlines.—Greater Peoria Airport, Peoria, Illinois.

Byerly operates a service between Jacksonville and Peoria connecting with Ozark flights to and from Chicago. The fleet consists of Lockheed 10As and single-engined aircraft.

President, R. M. Byerly; vice-pres., W. M. Staker; corp. secretary, J. J. Geils; treasurer, R. F. Sitton.

Capital Airlines, Inc.—National Airport, Washington 1, D.C.

Capital's history goes back to 1927. Its name, prior to 1948, was Pennsylvania-Central Airlines. Capital is one of the largest U.S. domestic operators and serves the east-central area, linking New York and New Orleans with cities in industrial America.

The fleet in 1958 consisted of 58 Viscounts, 11 L-049s, 12 DC-4s and 18 DC-3s. Financing arrangements are being made for the purchase of seven Convair 880s and five Lockheed Electras.

President, David H. Baker; sen. vice-pres. for finance and treasurer, R. G. Lochiel; sen. vice-pres. for marketing, Walter H. Johnson, Jr.; vice-pres., operations and maintenance, J. B. Franklin.

Catalina Pacific Airlines.—186 North Canon Drive, Beverly Hills, California.

Two divisions of this organization—Catalina Airlines and Palm Springs Airlines—operate respectively services from Los Angeles to Catalina Island and to Palm Springs. The fleet consists of two D.H. Doves and one DC-3.

Central Airlines, Inc.—Amon Carter Field, Fort Worth, Texas.

Founded in Oklahoma in March, 1944, Central began certificated operations in September, 1949. Operations cover a network between Fort Worth/Dallas in the south, Denver/Amarillo in the west, St. Louis/Little Rock in the east and Kansas City in the north.

The fleet consists of 15 21-passenger DC-3s.

Chairman, F. Kirk Johnson; president, Keith H. Kahle; exec. vice-pres. and treasurer, F. E. Howe; vice-pres., operations, Russell L. Wageneck; vice-pres., traffic and sales, A. S. Aldridge.

Chicago Airways, Inc.—1791 W. Howard St., Chicago 26, Illinois.

This airline operates local services from Midway, Hammond and O'Hare Airports, Chicago.

One of Eastern Air Lines' Electras—seen here taxi-ing out at McCarran Field, Las Vegas, while on non-scheduled work during the World Congress of Flight last April.

On the right, one of United Air Lines' DC-8s is seen against a San Francisco background.

Below, centre, is one of Continental Airlines' Viscount 812s on the apron at Denver, Continental's base.

Chicago Helicopter Airways, Inc.—5240 West 63rd Street, Chicago 38, Illinois.

An associate of Helicopter Air Services, which had been flying mail and freight in the Chicago area since 1949, this helicopter operator started scheduled passenger services between Midway Airport and O'Hare Airport (later taking in Meigs Field) in November, 1956. Passenger services to Gary, Indiana, and Winnetka are also operated.

The fleet consists of six 12-passenger S-58s and six Bell 47s.

President and treasurer, John S. Gleason, Jr.; exec. vice-pres., C. W. Moore; vice-pres. and secretary, John C. Brogan; vice-pres. operations, R. S. Angstadt; asst. secretary/treasurer, R. B. Kiel; vice-pres., traffic and sales, Clarence E. Liske.

Continental Airlines, Inc.—Stapleton Airfield, Denver, Colorado.

Continental started operations in July, 1934, as Varney Speed Lines of El Paso, Texas, and is now a major regional carrier serving eight states within an area between Chicago, Kansas City, Houston, Dallas, Denver and Los Angeles. Non-stop Boeing 707 flights between Chicago and Los Angeles were started on June 8 this year and on April 1 Viscount 812 flights had been increased with non-stop services across Texas and New Mexico.

The fleet in August, 1959, consisted of four Boeing 707s, 15 Viscount 812s, five DC-7Bs, three DC-6Bs and 10 (leased) DC-3s.

President, Robert F. Six; exec. vice-pres., Harding L. Lawrence. Vice-presidents: engineering, Charles H. Calhoun; sales, Marvin L. Davis; passenger services, L. H. Dennis; public affairs, Mark Kramer; operations, O. R. Haueter; economic planning, sales, Chris F. Whelan.

Cordova Airlines, Inc.—P.O. Box 6203, Anchorage.

Cordova flies schedules in the Anchorage, Cordova and Seward area. It began operations in 1934.

The fleet in 1958 consisted of one C-46, two DC-3s, two Grumman Widgeons and one Cessna 180.

President and general manager, Merle K. Smith.

Delta Air Lines, Inc.—Atlanta Airport, Atlanta, Georgia.

This carrier's domestic network connects New York, Atlanta and Dallas/Fort Worth; Detroit, Memphis and Houston; Miami and Chicago, and Chicago and New Orleans. International services operate to Havana, Montego Bay (Jamaica) and Caracas (Venezuela), and from Havana to Port au Prince, Ciudad Trujillo and San Juan, Puerto Rico. Delta, which merged with Chicago and Southern in 1953, started operations in 1929.

At mid-1959 the fleet consisted of 21 DC-7/7Bs, 12 DC-6s, 28 Convair 340/440s, 12 DC-3s (two cargo) and five C-46s (cargo). Six DC-8s (two since delivered and now in service) and 10 Convair 880s were on order.

President and general manager, C. E. Woolman; sen. vice-pres. and asst. to president, L. C. Parker; exec. vice-pres., administrator, T. G. Cole; exec. vice-pres., operations, C. H. Dolson. Vice-presidents: personnel, W. T. Beebe, civic affairs, Erle Cocke, Jr.; legal, R. S. Maurer; traffic and sales admin., T. M. Miller. Secretary-treasurer, C. W. McHenry.

Ellis Air Lines.—P.O. Box 1059, Ketchikan, Alaska.

In 1936, R. E. Ellis started operations and was later joined by J. L. Sherman. In 1940 the company was incorporated. In 1952 an international route—to Prince Rupert, British Columbia—was added to its intra-Alaskan services. The company is employee-owned and has 13 aircraft, including nine Grumman Goose.

President, Robert E. Ellis; vice-pres., maintenance, John L. Sherman; vice-pres., operations, G. A. Bodding; secretary-treasurer, Norman T. Gerde.

Eastern Air Lines, Inc.—10 Rockefeller Plaza, New York 20, N.Y.

Eastern originated in 1928 as Pitcairn Aviation; the title of Eastern Air Transport was adopted in 1930. The present network extends from New York and Boston to Washington, Atlanta, New Orleans, Houston, Miami, Tampa, Mexico City and Puerto Rico; to Bermuda; and to Montreal. From Chicago, Detroit, Cleveland, Pittsburgh, St. Louis and Memphis services are flown to Miami.

The present fleet includes 40 Electras; 38 L-1049 A/C/Gs; 17 L-749s; 48 DC-7Bs; 56 Martin 404s; 20 Convair 440s; and seven DC-6Bs. On order are 16 DC-8s.

Chairman, Capt. E. V. Rickenbacker; president, Malcolm A. MacIntyre; vice-pres., operations, J. H. Halliburton; vice-pres., sales and traffic, W. L. Morisette, Jr.

Flying Tiger Line, Inc.—Lockheed Air Terminal, Burbank, California.

Flying Tiger was founded in June, 1945, by Robert W. Prescott. It specializes in scheduled all-cargo and non-scheduled passenger and cargo operations.

At the end of 1958, Flying Tiger's fleet consisted of 14 L-1049Hs and two C-46s.

President, Robert W. Prescott; exec. vice-pres. and treasurer, Fred Benninger. Vice-pres.: sales, John L. Higgins and George T. Cussen; research and development, Wm. E. Bartling; operations, Frank B. Lynott; publicity, L. S. Kimball; maintenance, Neil B. Berboth. Secretary and asst. treasurer, O. R. Burghardt.

Frontier Airlines, Inc.—Stapleton Airfield, Denver 5, Colorado.

Scheduled operations were started by Frontier's predecessor in November, 1946. The airline serves 74 cities in 11 Rocky Mountain and Western Great Plains states. The service ties together the main points in a large and rugged area.

The present fleet consists of four Convair 340s and 24 DC-3s.

President and chairman, Lewis B. Maytag, Jr.; exec. vice-pres., G. R. Woody; vice-pres., operations, Harvey P. Bernard, Jr.; secretary, John A. Love; vice-pres. and treasurer, L. Preston Blatter.

Gulf Coast Airways.—Holmes Airport, Holmes Beach, Anna Maria Island, Florida.

Gulf Coast was founded on September 1, 1957. Services are operated between Anna Maria Island and Tampa, Florida and Cocoa-Cape Canaveral and between Canaveral and Jacksonville, Florida.

The fleet consists of two D.H. Doves and one Cessna 195.

President, J. G. Spence; vice-pres., Grace Campbell; operations manager and secretary, Lyle C. Lindbloom.

Hawaiian Airlines.—International Airport, Honolulu, Hawaii.

One of the pioneer U.S. airlines and holder of the World's safety record, Hawaiian was incorporated in January, 1929. Originally named Inter-Island Airways, Hawaiian was the first scheduled airline in the U.S. to use all-cargo aircraft. Scheduled service throughout the Hawaiian Islands was started with Sikorsky amphibians. DC-3s were put into service in 1941, followed by Convair 340s in 1952. A DC-6C was purchased in January, 1958, and, after extensive cabin modification, went into trans-Pacific service on a contract with M.A.T.S. Three Convair 440s were purchased in May, 1959, and went into service at the beginning of the summer traffic season. By modifying the remaining Convairs, an all-Convair 440 fleet will be in operation by the end of 1959.

At mid-1959, the fleet consisted of one DC-6, three Convair 440s, four Convair 340s, five DC-3s and two C-47s (cargo).

Chairman, Stanley C. Kennedy; president, Arthur D. Lewis; vice-pres., finance, Brian Cooke; vice-pres., operations, Lionel Machado; vice-pres., sales and service, Jack C. Tobin; vice-pres., industrial relations, Lyman Conant; vice-pres., planning and development, William Crilly; secretary, Lambert P. Irons; treasurer, George K. Tanabe.

Lake Central Airlines, Inc.—Weir Cook Airport, Indianapolis 44, Indiana.

Originally known as Turner Airlines, the first scheduled flight by Lake Central was made in November, 1949. As its title suggests, Lake Central operates over a network south of Lake Erie—from Chicago in the west to Buffalo, N.Y., in the east and Cincinnati in the south. The fleet consists of 12 DC-3s.

Chairman, J. J. O'Connell; president, Gwin Hicks; exec. vice-pres. and treasurer, Lloyd W. Hartman; vice-pres., traffic, D. S. Getchell; vice-pres., operations, R. W. Clifford.

Long Island Airways, Inc.—MacArthur Airport, Ronkonkoma, New York.

This new local carrier operates between New York (La Guardia) and Montauk Point on Long Island.

Los Angeles Airways, Inc.—P.O. Box 10155, Los Angeles Airport, Los Angeles 45, California.

The first scheduled air-mail helicopter operator, Los Angeles Airways was incorporated in May, 1944. Operations were started in October, 1947, with five S-51s. Passenger services were started in 1954, using the available capacity on the mail services. Normal scheduled all-passenger services are now flown between the International Airport and outlying points.

The fleet in 1958 consisted of five S-55s and two S-51s.

President, C. M. Belinn; treasurer, John T. Kane; secretary, Martin J. Burke; operations manager, R. L. Bromberger.

Mackey Airlines, Inc.—Broward County International Airport, Fort Lauderdale, Florida.

Originally a non-scheduled operator, formed in 1946 as Mackey Air Transport, this company started scheduled services in 1952.

The fleet in 1958 consisted of four

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DC-3s, two DC-4s and two Grumman Goose.

President, Joseph C. Mackey; exec. vice-pres., Leonard J. Povey; treasurer and director of maintenance, John H. Popham; traffic manager, H. H. Johnson.

Mohawk Airlines, Inc. — Oneida County Airport, Utica, New York.

Mohawk serves 30 cities in the north-east section of the U.S. Its route system extends from Detroit/Michigan to Boston/Massachusetts and from New York City to Watertown and Ogdensburg on the Canadian border. Mohawk was formed in 1945 as Robinson Airlines and took its present name in 1951.

The current fleet consists of four Convair 440s, 11 Convair 240s and eight DC-3s.

Chairman of the Board, E. V. Underwood; president, Robert E. Peach; vice-pres., Carl A. Benscoter; vice-pres. and general counsel, John R. Carver; vice-pres., personnel, Russel V. Stephenson; treasurer, Frank A. Chabot; comptroller, Robert J. Longwell; secretary, Bruce C. McLean; exec. asst. to president, Helen R. Thomas.

Naples Airlines.—Naples America Airport, Naples-on-the-Gulf, Florida.

This carrier operates between Miami and Naples, Florida.

National Airlines, Inc. — International Airport, Miami 59, Florida.

Formed in 1934 as a regional carrier, National is now a major long-haul airline serving the Atlantic Coast region, Florida and the Gulf Coast. The present route network extends from Boston, New York and Washington to Miami and Havana, and westwards to New Orleans and Houston.

The fleet at the end of 1958 consisted of four L-1049Hs, four DC-7Bs, four DC-7s, eight DC-6Bs, four DC-6s, six Convair 440s and 12 Convair 340s. During the winter of 1959 National (on a reciprocal agreement) leased Boeing 707s from Pan American for the New York-Miami run and this arrangement will be repeated. Three DC-8s are on order and six of 23 Lockheed Electras were in service by September.

President, G. T. Baker; exec. vice-pres., J. C. Brawner; sen. vice-pres., industrial relations, J. M. Rosenthal; sen. vice-pres., market development, Walter Sternberg; sen. vice-pres., Washington, A. G. Hardy; vice-pres., operations, maintenance and engineering, L. W. Dymond; secretary, R. P. Foreman.

New York Airways, Inc.—P.O. Box 426, La Guardia Airport Station, Flushing 71, New York.

Formed in August, 1949, as a helicopter operator after flying mail services, N.Y.A. inaugurated the first scheduled helicopter freight service in January, 1953, and the first scheduled passenger services were started on July 8, 1953, between the three principal metropolitan airports of New York—La Guardia, New York International and Newark.

Regular services are also flown to points in Connecticut, New Jersey and New York. After flying freight into Manhattan's new heliport, passenger services followed in December, 1956.

At mid-1959 the fleet consisted of five Vertol 44Bs and two Bell 47Js.

President and director, Robert L. Cummings, Jr.; vice-pres. and director, Horace Brock; vice-pres., operations, J. E. Gallagher; treasurer, W. W. Hogan; vice-pres., Glen B. Eastburn; secretary, John H. Slate; traffic and sales manager, R. Wheatland.

North Central Airlines, Inc.—6201 South 34th Avenue, Minneapolis, 50.

This carrier started operations as Wisconsin Central Airlines in February, 1948, from a base at Madison. The headquarters were moved to Minneapolis in November, 1952, and in December, 1952, the present name was adopted. North Central's network is in the Great Lakes area and extends from Detroit and Chicago to Minneapolis and into North Dakota, serving 68 cities through nine States.

The fleet consists of 32 DC-3s and five Convair 340s.

President and general manager, H. N. Carr; vice-pres., traffic and sales, F. N. Buttomer; vice-pres., flight operations, A. D. Niemeyer; vice-pres., maintenance and engineering, R. H. Bendio, Sr.; vice-pres., industrial relations, A. E. Schwandt; vice-pres., secretary-treasurer, Bernard Sweet; vice-pres. and counsel, A. L. Wheeler; director, ground operations, T. M. Needham; asst. secretary, J. P. Dow.

Northeast Airlines, Inc.—Logan International Airport, Boston 28, Massachusetts.

Formed in 1933 as Boston-Maine Airways, Northeast was the first to serve New England. With railway support, it was merged with Central Vermont Airways. The company's present name was adopted in 1940, after the railways had relinquished their interest. The Atlas Corporation succeeded as the main investor. Northeast now operates on the Boston-New York-Miami run and into Montreal.

The fleet consists of 11 DC-3s, 10 DC-6Bs, and 10 Viscount 745s.

Chairman and general manager, David A. Stretch; president, James W. Austin; vice-pres., traffic and sales, Nelson B. Fry; vice-pres., admin. and finance, Hamilton Heard; vice-pres., personnel, R. H. Kerr; vice-pres., operations, Thomas L. Grace; treasurer, R. P. Lane, Jr.; vice-pres., engineering and maintenance, Edmund O. Schroeder.

Northern Airlines.—P.O. Box 1041, Fargo, North Dakota.

Using Aero Commanders, this carrier operates services Fargo-Minot and Fargo-Duluth.

Northern Consolidated Airlines, Inc.—Box 61333, International Airport, Anchorage, Alaska.

Incorporated in November, 1945, Northern Consolidated was the result of a merger of four carriers—Northern Airways, Dodson Air Service, Ray Petersen Flying Service and Walatka Air Service. Services, scheduled and non-scheduled, are flown from Anchorage and Fairbanks to points in interior south-western Alaska.

The fleet consists of three F-27Bs, three DC-3s and eight Cessna T-50s.

President and general manager, Raymond I. Petersen; special asst. to president, James A. Dodson; vice-pres. and treasurer, S. B. Fitzhugh; secretary and general traffic manager, Victor R. Davis; general sales manager, Luther P. Fritz; supt. of maintenance, Alfred DuFault; purchasing agent, Howard Fowler; flight supt., Ray Jones.

Northwest Airlines, Inc.—1885 University Avenue, St. Paul 1, Minnesota.

Northwest started operations in 1926 with a service from Minneapolis/St. Paul to Chicago. By 1933 services had reached the west coast at Seattle/Tacoma. In 1945 the company became a transcontinental operator when its routes were extended eastward from Minneapolis/St. Paul to New York and Washington, D.C. The promotional name, Northwest Orient Airlines, was adopted after services to the Far East were started in 1947. Northwest's trunk services are from New York City and Washington, D.C., to Portland and Seattle/Tacoma; from Miami, Tampa/St. Petersburg and Atlanta to Chicago and west; to Alaska, Canada, Hawaii, Japan, Korea, Okinawa, Taiwan (Formosa) and the Philippines.

At mid-1959 Northwest's fleet consisted of eight Boeing B-377 Stratocruisers, 24 Douglas DC-6Bs, 14 Douglas DC-7Cs, 12 Douglas DC-4s and four Lockheed Electras. An additional six Electras are being delivered and five Douglas DC-8s will be delivered in 1960.

Chairman, Croil Hunter; president, Donald W. Nyrop; vice-pres., operations, Frank C. Judd; vice-pres., sales, Gordon M. Bain; vice-pres., Orient region, Paul L. Benscoter; vice-pres. and secretary, A. E. Floan; vice-pres., public relations, Phillip T. Drotning, vice-pres., plans, C. Larry Stewart; treasurer, Wm. J. Eiden; asst. vice-pres., properties, Dale Merrick.

Ozark Air Lines, Inc., Lambert Field, St. Louis 34, Missouri.

Formed in September, 1943, Ozark first flew local services, and route certificates were awarded in 1950, when Ozark also acquired the assets and personnel of Parks Air Lines. A network is flown within an area bounded by Chicago, Milwaukee, Minneapolis/St. Paul and Indianapolis in the north-east, by Omaha in the north-west, by Nashville and Louisville in the south-east, and by Wichita in the south-west.

The fleet at mid-1959 consisted of 24 DC-3s and three F-27s.

Chairman and vice-pres., Floyd W. Jones; general counsel and secretary, Arthur G. Heyne; exec. vice-pres., Joseph H. FitzGerald.

Pacific Air Lines, Inc.—International Airport, San Francisco 28, California.

A scheduled operator since December, 1946, Pacific Air Lines (previously Southwest Airways Company) serves communities, mainly in California, between Los Angeles and Medford, Oregon.

The fleet consists of six F-27s, 11 DC-3s and eight Martin 202s.

President, J. H. Connelly; exec. vice-pres., T. R. Mitchell; vice-pres. traffic and sales, R. E. Costello; vice-pres. public relations, M. A. King; treasurer, E. R. Dahl.

Pacific Northern Airlines, Inc.—1626 Exchange Building, Seattle 4, Washington.

Although now based in Seattle, Pacific Northern is an Alaskan operator. Its president started Woodley Airways in 1932 and the company was the first in Alaska to be given a C.A.A. scheduled operating certificate. Three main-line routes were developed—from Anchorage to Kodiak, Bristol Bay and Juneau—and in 1951 a service was opened to the U.S. Pacific north-west, where the base is now situated.

The fleet includes six L-749s and three DC-3s.

President and general manager, A. G. Woodley. Vice-presidents: traffic and sales, H. A. Olsen; operations, J. A. Cunningham; engineering and maintenance, J. H. Foster; industrial relations, Thomas Stuart; Alaska, Felix Aubuchon. Secretary-treasurer, C. W. Nelson.

Pacific Southwest Airlines.—Lindbergh Field, San Diego, California.

Using DC-4s, Pacific Southwest operates scheduled passenger services between San Diego, Los Angeles (International and Burbank) and San Francisco.

President, K. G. Friedkin; traffic and sales manager, Hugh N. Wood.

Pan American-Grace Airways, Inc. (Panagra).—Chrysler Building, 135 East 42nd Street, New York, 17, N.Y.

Formed in February, 1929, Panagra is jointly owned by P.A.W.A. and W. R. Grace and Co., an industrial and trading concern. It operates within Bolivia and Ecuador; to Argentina, Bolivia, Chile, Colombia, Ecuador, Panama and Peru, and into the U.S.A. under an interchange agreement with National and P.A.W.A. An all-cargo service is operated from Miami to Bolivia.

The aircraft fleet consists of four DC-3s, two DC-4s, four DC-6Bs and six DC-7Bs. Four DC-8s are on order.

President, Andrew B. Shea. Vice-presidents: general manager, Douglas Campbell; operations, Thomas J. Kirkland; comptroller, Ludwig H. Clifton; traffic and sales, Cyrus S. Collins; Erwin Balluder; Edward L. Farrell. Treasurer, John S. Woodbridge; secretary, Gail M. Oxley.

Pan American World Airways, Inc.—Chrysler Building, 135 East 42nd Street, New York 17, N.Y.

Pan American inaugurated U.S.-flag international air services on October 28, 1927, with its first flight, a 90-mile run from Key West, Florida, to Havana, Cuba, in a Fokker F-7. Services were extended through the Caribbean and into Central and South America. Plans for flying the oceans progressed simultaneously and service was opened across the Pacific to Manila in 1935. In 1939 the company inaugurated service across the Atlantic. A route network through Europe and Asia was developed and finally extended around the World.

In October, 1958, Pan American started transatlantic turbojet services using the Boeing 707. By mid-1959 turbojet flights were operating to London, Paris and Rome and southward from New York to Buenos Aires. Preparations were under way for jet services from the West Coast of the United States to Europe and across the Pacific.

The present fleet is composed of six Boeing 707/121s, five 707/321s, 22 Stratocruisers, seven DC-7Bs, 25 DC-7Cs, 42 DC-6Bs, 22 DC-4s (12 cargo) and four DC-6As (ca'go). On order are 12 707 321s and 17 DC-8s.

President, Juan T. Trippe; exec. vice-pres., administration, Roger Lewis; exec. vice-pres., Latin American Division, Wilbur L. Morrison; exec. vice-pres., Atlantic Division, Harold E. Gray; exec. vice-pres., Pacific-Alaska Division, Robert B. Murray, Jr.; vice-pres. and asst. to president, John C. Leslie. Vice-presidents: Samuel F. Pryor; general counsel, Henry J. Friendly; Franklin Gledhill; traffic and sales, Willis G. Lipscomb; development, John B. Gates; Alvin P. Adams; Erwin Balluder; associate general counsel, John C. Pirie; Russell B. Adams; A. Jackson Kelly; Humphrey W. Toomey; Norman P. Blake; services of supply, Henry H. Berke; industrial relations, Everett M. Goulard; Guided Missiles Range Division, Richard S. Mitchel, Treasurer, Robert G. Ferguson; comptroller, John S. Woodbridge; secretary and general attorney, H. Preston Morris.

Piedmont Aviation, Inc. — Smith Reynolds Airport, Winston-Salem 1, N. Carolina.

Piedmont originated in 1940 as a sales organization and school. In April, 1947, the C.A.B. certificated the company for local-service operations over a network of routes between Virginia and N. Carolina and Ohio and Kentucky. The first service was flown in February, 1948.

The fleet consists of eight F-27s and 21 DC-3s.

President and treasurer, T. H. Davis; vice-presidents, C. G. Brown, Jr., H. R. Saunders and R. S. Northington; secretary and asst. treasurer, M. F. Fare; asst. controller, T. W. Morton.

Provincetown-Boston Airline, Inc.—Municipal Airport, Provincetown, Massachusetts.

With Cessna 190 and Lockheed Electra, P.-B.A. operates a feeder service between Provincetown and Logan Airport, Boston.

President, J. C. Van Arsdale.

Reeve Aleutian Airways, Inc.—P.O. Box 559, Anchorage, Alaska.

Reeve operates scheduled services serving Alaska, the Aleutians and Pribilof Islands. It was founded in 1932 and received route certificates in 1948. The fleet in 1958 included two DC-3s a DC-4 and a C-46.

President and supt. of operations, R. C. Reeve; secretary-comptroller, Margaret Rutledge.

Riddle Airlines, Inc.—International Airport, Miami, Florida.

Riddle is an all-cargo carrier with certificates to operate services New York-San Juan (Puerto Rico)-Miami and Miami-Atlanta-Chicago-Detroit with 19 intermediate traffic stops. Charter operations were started by Riddle in 1947 on the New York-San Juan run.

At mid-1959 Riddle's fleet consisted of 28 C-46s and two DC-4s.

President, Robert Hewitt; sen. vice-pres. and treasurer, Edward T. Thompson, Jr.; vice-pres., sales and traffic, Charles L. Hood; vice-pres., maintenance and engineering, Norman H. Golden; regional vice-pres., New York, H. T. Weaver; secretary, Jane B. Love.

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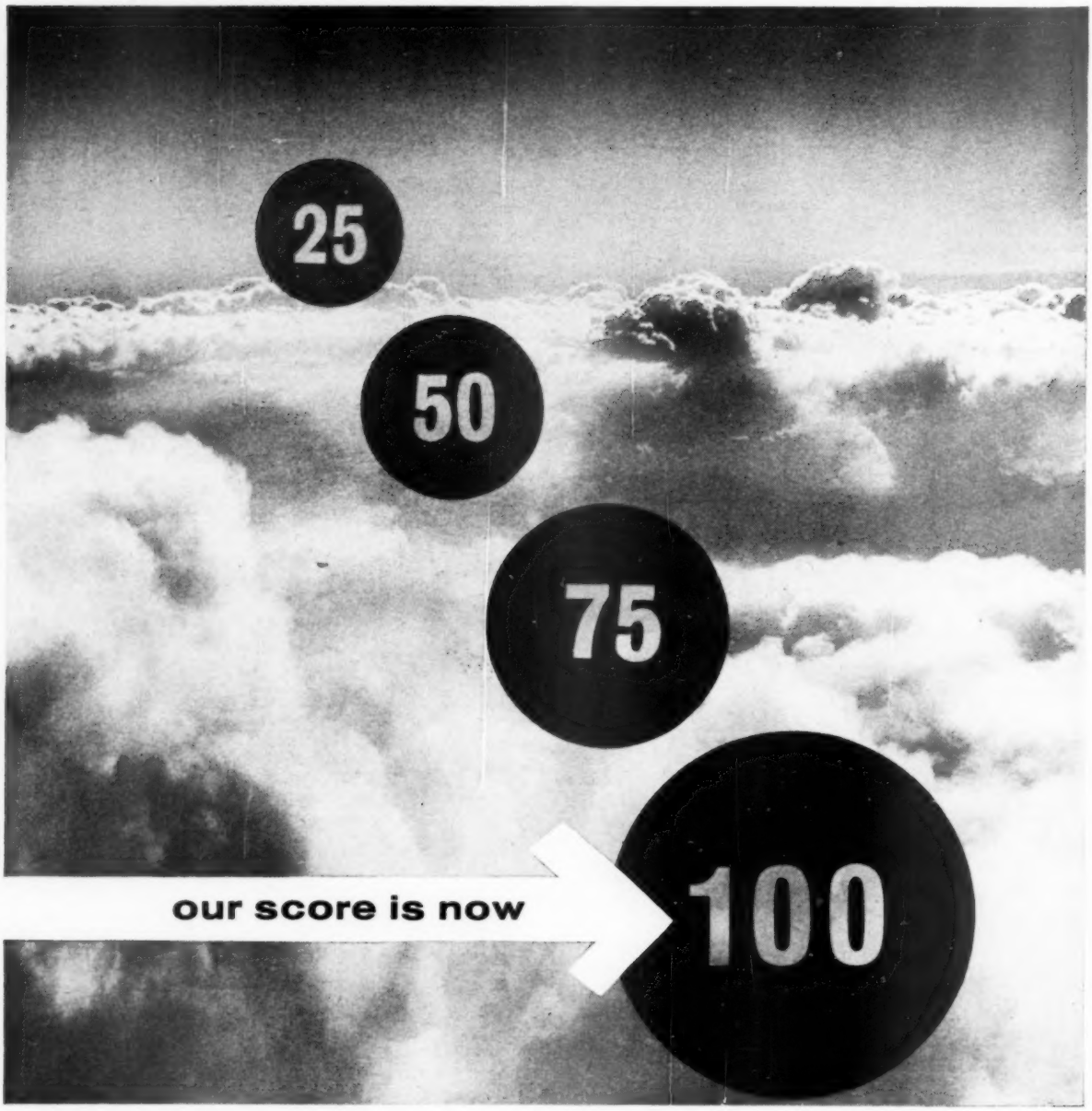

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Seaboard and Western Airlines, Inc.—80 Broad Street, New York 4, New York.

Seaboard's application for certificated North Atlantic all-cargo rights was approved early in 1955, and services were started in April of that year. These form only a part of the total work done by this carrier, which started operations in 1947.

At the end of 1958, the fleet consisted of seven 1049s, three DC-4s, one C-46 and one Viking.

President, Raymond A. Norden; exec. vice-pres. and treasurer, Arthur V. Norden. Vice-presidents: operations, Carl D. Brell; engineering, Warren H. Renninger; maintenance, Edmund O. Schroeder; traffic and secretary, Wallace P. Neth; commercial services, Alastair Thomson; administration, John H. Rosenwald; John H. Mahoney; Harold Montee.

Southeast Airlines, Inc.—P.O. Box 46, Kingsport, Tennessee.

Southeast operates scheduled services within the State of Tennessee. The fleet consists of five DC-3s and two Convair 240s.

President, E. W. King; vice-pres., John B. Roberts.

Southern Airways, Inc. — 1101 Brown-Marx Building, Birmingham 6, Alabama.

Formed in Delaware in July, 1943, Southern started operations in June, 1949, with a system linking cities in south-eastern states. The present network lies between Jacksonville (Florida), Charlotte (North Carolina), Memphis (Tennessee) and New Orleans (Louisiana).

The fleet in 1958 consisted of 13 DC-3s.

President, F. W. Hulse; vice-president, I. F. Jones; vice-pres., sales, C. M. Britt; vice-pres., operations, W. S. Magill; secretary-treasurer, G. F. Estey.

Tag Airlines.—Lakefront Airport, Cleveland, Ohio.

Formerly Taxi Air Group, Tag began operations in April, 1956. It operates D.H. Heron services, taking in Chicago (Meigs Field), Rockford, Akron, Detroit and Cleveland.

General manager, E. F. Knight; secretary/treasurer, W. W. Knight; vice-pres., operations, E. A. Eklund; vice-pres., sales, W. J. Swann.

Trans Caribbean Airways. — 375 Park Avenue, New York 22, N.Y.

This company operates scheduled daily services between New York and San Juan, Puerto Rico. The fleet consists of three DC-6A/Bs, one DC-4 and two C-46s.

President and director, O. Roy Chalk; exec. vice-pres., treasurer and director, Irving M. Buckley; director, traffic and sales and asst. v.-p., David J. McFarland; gen. traffic mgr., Morel Dickman; cargo sales mgr., James H. McGuinnes; pass. and interline sales mgr., Herbert Keilsen; director, flight operations, Alfred J. Cohen.

Transocean Air Lines. — International Airport, Oakland, California; and P.O. Box 307, Agana Field, Guam Island, Marianas Islands, Pacific Ocean.

Transocean flies, as Trust Territory operations, a local service in the Pacific between Guam and the Marshall Islands. Services are also flown from Oakland to Honolulu, Wake Is., Guam Is. and Okinawa.

The fleet includes Stratocruisers, L-1049s, an L-749, DC-4s, and (for Trust Territory operations) Grumman Albatross.

President and chairman, O. M. Nelson; secretary-treasurer, S. A. Nichols.

Trans-Texas Airways. — Municipal Airport, Houston 17, Texas.

Trans-Texas serves points in the States of Texas, Louisiana, Arkansas and Tennessee. Originally known as Aviation Enterprises, Ltd., scheduled services were started in October, 1947.

The fleet in 1958 consisted of 20 DC-3s.

President, R. E. McKaughan; vice-pres., operations, H. E. Erdmann; vice-pres., traffic and sales, L. J. Eichner; secretary-treasurer, M. L. Muse.

Trans World Airlines, Inc.—10 Richard Road, Kansas City 5, Missouri.

The original T.W.A. (Transcontinental and Western Air) was formed in 1930 after a merger of four airlines, and the present name was adopted in 1950. A domestic and a transcontinental operator, T.W.A. is also one of the two main international U.S. carriers with services to Europe, North Africa, Egypt, India and the Far East. T.W.A. has applied for rights to Honolulu from Los Angeles and to new points in Europe. A polar route service, providing direct schedules from the U.S. west coast to Europe, is operated.

At mid-1959 the fleet consisted of 15 Boeing 707-131s, 28 L-1649As, 27 L-1049Gs, 18 L-1049s, 70 L-749s, 35 Martin 404s, one DC-4, and one Fairchild C-82 freighter. On order were 30 Convair 880s and 13 707-331s.

Chairman, Warren Lee Pierson; president, Charles S. Thomas; sen. vice-pres. and system general mgr., E. O. Cocke; vice-pres., finance, A. V. Leslie vice-pres., transportation, Floyd Hall; vice-pres., sales, Louis Marechal.

United Air Lines, Inc.—5959S, Cicero Avenue, Chicago 38, Ill.

Formed in July, 1931, after the merger of four pioneer airlines, United's operational history began in April, 1926, when one of its pioneer companies, Varney Air Lines, began scheduled service. United introduced the modern aircraft formula when, in 1933, the Boeing 247 brought in a 20-hour transcontinental schedule. W. A. Patterson has been president since 1934.

United serves 80 cities in 23 States, British Columbia and Hawaii over a 14,000-mile system. Turbojet services with DC-8s were inaugurated on September 18 between New York and San Francisco.

At mid-September the fleet consisted of six DC-8s, seven DC-6As, 41 DC-6Bs, 42 DC-6s, 46 Convair 340s and 55 DC-7s. On order were 34 DC-8s and 18 Boeing 720s (for 1960 delivery).

President, W. A. Patterson; sen. vice-pres., engineering and maintenance, J. A. Herlihy. Vice-presidents: engineering, W. C. Mentzer; base maintenance, W. P. Hoare; (sen. v.-p.), transportation services, D. F. Magarrell; ground services, O. T. Larson; passenger service, O. C. Enge; (sen. v.-p.), flight operations, D. R. Petty; flying, I. E. Sommermeyer; flight administration, J. M. Hodgson; (sen. v.-p.), sales and public relations, R. E. Johnson; marketing, B. B. Gragg; sales manager, H. J. Merchant; finance and property, Curtis Barkes; treasurer, A. M. de Voursney; purchasing and stores, D. V. O'Leary; facilities and property, D. C. Meenan; (sen. v.-p.), personnel, R. F. Ahrens; employee relations, C. M. Mason; education and training, T. Lee, Jr.; (sen. v.-p.), economic controls, H. E. Nourse.

United States Overseas Airlines, Inc.—Cape May County Airport, Box 234, Wildwood, N.J.

Primarily a non-scheduled freight operator, U.S. Overseas began operations in 1946 and flies scheduled passenger services between Miami, New York, Chicago, Los Angeles and San Francisco and from Los Angeles to Honolulu. Scheduled freight services are operated for the U.S. Navy.

The fleet consists of nine DC-4s and two L-1049s.

President, R. W. E. Cox; exec. vice-pres., Ralph Cox, Jr.; vice-pres., D. C. Cox, Jr.; secretary, R. L. McSweeney.

West Coast Airlines, Inc.—Georgetown Station, Seattle 8, Washington.

West Coast was certificated as a local-service operator in 1946 and began operations in December of that year. Permanent certification was received in February, 1956. It serves most of the scheduled airline stops in Washington, Oregon and Idaho—plus Logan, Ogden and Salt Lake City in Utah; Sacramento, Oakland and San Francisco in California; and Kalispell, Cut Bank-Shelby and Great Falls in Montana.

The fleet consists of 14 DC-3s and six F-27s.

President, Nick Bez; vice-pres., community and public relations, Tom Croson; vice-pres., planning and engineering, E. B. Code; secretary-treasurer, Lewis Hawkinson.

Western Air Lines, Inc.—P.O. Box 90005, Airport Station, Los Angeles 45, California.

America's oldest airline, Western operated its first scheduled service in 1926 between Salt Lake City, Las Vegas and Los Angeles. It now flies networks in California, Oregon, Washington, Nevada, Arizona, Utah, Wyoming, Idaho, Montana, Nebraska, S. Dakota, Colorado and Minnesota, and into south-west Canada and Mexico from Los Angeles.

At mid-1959 the fleet consisted of one Electra, 27 DC-6Bs, and six Convair 240s. Eight more Electras were due to be delivered, four in 1959.

President, Terrell C. Drinkwater, Vice-presidents: operations, Stanley R. Shatto; service, Marvin W. Landes; sales, Arthur F. Kelly; treasurer, J. Judson Taylor; legal and secretary, D. P. Renda; administration, Stanley Gewirtz and G. G. Brooder.

Wien Alaska Airlines, Inc.—P.O. Box 649, Fairbanks.

The scheduled runs flown by Wien Alaska from Fairbanks include services to Nome, Point Barrow, Fort Yukon and Kotzebue. Previously known as Northern Air Transport, the history of which goes back to 1924; operations under the present name started in 1936. In July, 1956, the routes of Byers Airways were taken over.

The fleet at mid-1959 consisted of two F-27s, three DC-3s, four C-46s, 10 Cessna 180s, Twin Beechcraft and Norseman.

President and general manager, Sigurd Wien; exec. vice-pres. and treasurer, G. B. Rayburn. Vice-presidents: operations, Frithjof Wien; traffic, A. E. Hagberg; public relations, Noel Wien. Secretary, R. M. King.

AMERICA (Central and South)

ARGENTINA

Aerolineas Argentinas. — Paseo Colon 185, Buenos Aires.

A department of the Ministry of Transport, and founded in 1949, Aerolineas Argentinas operates domestically and internationally to neighbouring countries and to Cuba, the U.S.A. and Europe.

The fleet at mid-1959 consisted of three Comet 4s (one since destroyed), 14 DC-3s, two C-47s, six DC-4s, five DC-6s, six Sandringhams and four Convair 240s. Three more Comet 4s were on order.

President, Brig. Miguel Noragues; vice-president, Dr. Angel Modesto Lagomarsino; admin. director, Air Cdre. Eugenio Rovere; technical director, Eurique D. Bermudez; commercial director, Hector Rodriguez; personnel manager, Alberto Regidor.

Aerotransport Litoral Argentino.—859 Sarmiento, Rosario.

Formed last year, A.L.A. has a licence to operate between Rosario and Buenos Aires and to other points. The fleet consists of DC-3s.

Austral (Cia. Argentina de Transportes Aereos S.A. C. e. I.)—Leandro N. Alem 498, Buenos Aires.

This company operates from Buenos Aires to Mar del Plata and Bahia Blanca, and to Rio Grande. The fleet consists of three C-46Cs (passenger) and one C-46 (cargo).

President, Dr. Carlos Menendez Behety; vice-pres., Alberto de Ridder; general manager, Jorge Rojas.

Lineas Aereas del Estado (LADE).—Corrientes 480, Buenos Aires.

LADE was formed by the Argentine Air Force and started domestic operations on September 4, 1940. Services were taken over by Aerolineas Argentinas, but were restarted in 1947. The fleet consists of DC-3s and DC-4s.

Director, Cdre. D. Mario Romanelli; dep. director, Vice-Cdre. D. Akim Viti; admin. manager, D. Oscar Enrique Spinolo; traffic manager, D. Domingo Petronio.

Norsur (Cia. Argentina de Aeronavigation).—675 Avenue Leandro N. Alem, Buenos Aires.

Using Lodestars, Norsur operates local services between Buenos Aires and Corrientes and between Posados and Iguassu Falls.

Primera Linea Aeres Santafesina S.A. (PLAS).—Vera Esquino, 25 de Maio, Santa Fé.

Using Lockheed 10A Electras, PLAS operates between Santa Fé Rosario and Buenos Aires.

Transportes Aereos Buenos Aires (TABA).—Libertad 1692, Buenos Aires.

Using Beech Expeditors, TABA operates local services.

Transcontinental, S.A.—Cerrito 1117, Buenos Aires.

Formed in 1956, California Eastern Aviation holds 25% of the capital. A long-haul service is operated to Sao Paulo, Rio de Janeiro, Caracas and New York, with domestic and international services to Paraguay and Uruguay.

The fleet consists of seven C-46s and two L-1049Hs. On order are two Britannia 320s and four Convair 880s.

President, Manuel Masllorens; vice-president, Ramon Masllorens; general manager, Adolfo Allaga Garcia.

BAHAMAS

Bahamas Airways, Ltd.—P.O. Box 65, Windsor Field Airport, Nassau, N.P.

Formed in 1936, Bahamas Airways was taken over by B.S.A.A. in January, 1949, and by B.O.A.C. in the same year. As from April 1, 1959, 80% of the shareholding was taken by J. E. Rylands (Skyways) and David Brown; B.O.A.C. retains 20%. Services are operated from Nassau to the islands in the Bahamas group and to Turks Island and Miami. From Dec. 15 two Hermes will fly on Nassau-Miami and Nassau-Palm Beach services.

The fleet at mid-1959 consisted of three DC-3s, two Grumman Goose and three Grumman Widgeons.

President, Sir George Roberts; chairman, David Brown; managing director, J. Eric Rylands; general manager, Capt. Peter C. Fair; secretary-accountant, K. Ashworth; traffic manager, H. Wilkinson; chief engineer, S. Edge; chief pilot and operations manager, Capt. F. Morgan; sales manager, A. Wagstaff.

BERMUDA

Eagle Airways (Bermuda), Ltd.—Radio Centre, Bermudiana Road, Hamilton.

A subsidiary of Eagle Airways/Aviation, this company operates to New York, Montreal, Washington and Nassau with a Viscount 805.

See also Eagle Airways under the United Kingdom heading.

BOLIVIA

Lloyd Aereo Boliviano, S.A.—Casilla 132, Cochabamba.

One of the first two airlines formed in Latin America, this company was founded in 1925 by the German colony in Bolivia. In 1941 it became a Bolivian national company, and from that year until 1946 was administered by Panagra. Since then it has been operated entirely by Bolivian interests, the government holding 58.57% of the capital. Apart from internal services, L.A.B. flies internationally to Chile, Argentina and Brazil.

At mid-1959 the fleet consisted of 10

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DC-3s, three Boeing B-17s and two DC-4s.

President, Edmundo Gonzalez; general manager, Rudolfo Galindo; asst. manager, José Rico; operations supt., Juan Moreira; maintenance supt., Carlos Arze, communications supt., Victor Veltze; traffic supt., E. Aguirre; accountant-general, Manuel Yañez.

BRAZIL

Cruzeiro (Servicos Aereos Cruzeiro do Sul, S.A.).—Avenida Rio Branco 128 (P.O. Box 190), Rio de Janeiro.

Successor to the German Condor Syndicat, which was established in 1926, Cruzeiro has been wholly Brazilian-owned since 1941, with private capital, when it was renamed Servicos Aereos Condor. The present name was adopted on nationalization and reorganization in 1942. Cruzeiro is a major shareholder in Transportes Aereos Catarinense and SAVAG. In addition to a domestic network, services are flown to British and French Guiana and Argentina.

The 1959 fleet includes 27 DC-3s, four Convair 440s, four Convair 340s, 10 Convair 240s and seven Fairchild C-82s.

President, Dr. Jose Bento Ribeiro Dantas. Directors: superintendent, Dr. L. Cardoso de Amorim Filho; J. Quintino Vieira de Carvalho; Dr. Eurico de Freitas Valle; Brig. Franklin A. Rocha; Dr. Murillo S. Pacheco; Dr. Carlos Emmanuel de Silva; Otto Breyer; Oswald Mueller.

Loide Aereo Nacional, S.A.—13 Avenida de Maio, 13-27 Andares, Rio de Janeiro.

This company was established in 1951 on the amalgamation of two other operators. A large domestic network is operated within Brazil. The fleet in 1958 consisted of 26 C-46s and four DC-6s.

President, Col. M. G. Jacques; general and operations manager, I. Pereira.

Navegacao Aerea Brasileira.—Santos Dumont Airport, Rio de Janeiro.

This carrier was founded in 1939, began operations in 1941, suspended them in 1948 and re-started in 1951. It operates stopping services from Rio to Vitoria and Belo Horizante, with intermediate stops. The fleet consists of DC-3s.

President, Dr. M. Barbosa; technical manager, R. Portela; commercial manager, G. de Oliveira.

Panair do Brasil S.A.—Santos Dumont Airport, Rio de Janeiro.

Originally a subsidiary of Pan American and formed in 1929, Panair has, since 1944, been largely Brazilian-owned and managed. P.A.W.A. holds 48% of the stock. International services are flown to Argentina, Uruguay, Paraguay, Chile and Peru and to points in Europe and the Middle East. The fleet consists of four DC-7Cs, four DC-6Cs, 12 L-049s and four Catalinas. Four DC-8s are on order.

Director president, Dr. Manoel Ferreira Guimaraes; superintendent director, Dr. Cesar Pires de Mello; director secretary, Dr. Alberto Torres Filho.

Paraense Transportes Aereos S.A.—13 Avenida de Maio, Belem.

This carrier operates services locally from Belem and to Brasilia and Rio de Janeiro. The fleet consists of C-46s.

REAL S.A. Transportes Aereos.—Rua Conselheiro Crispiniano, 379-2°, Sao Paulo.

Founded in 1946, REAL took over, in 1954, the control of Aerovias Brasil and its subsidiary, Aeronorte. In 1956 REAL-Aerovias took over Nacional Transportes Aereos and, later, Sadia S.A. A large domestic network is operated and external services are flown to Uruguay, Paraguay, Argentina and Venezuela, and to Trinidad, Miami and Chicago. The fleet in 1958 consisted of 78 DC-3s, six Convair 340s, 10 Convair 440s, three DC-4s, 18 C-46s and four L-1049Hs. On order were eight Convair 440s and four Convair 880s.

President, Linneu Gomes. Directors: operations, Capts. J. B. Damasceno and Armando A. Campos; traffic, Capts. Ary Flemming and Omar Fontana; administration, Dr. Joaquim Peixoto Rocha.

Sadia S.A. Transportes Aereos.—470 Rua Sao Bento, Sao Paulo.

Sadia is a unit in the REAL consortium.

SAVAG (S.A. Viacao Aerea Gaucha). — Edificio Camara do Comercio, Rio Grande do Sul.

SAVAG operates between Rio Grande do Sul, Porto Alegre, Bage and Erechim. Crews and technical assistance are supplied by Cruzeiro do Sul which is a majority shareholder. SAVAG was founded in 1946. The fleet consists of DC-3s.

President, E. C. Becker; vice-pres., V. V. de Fonesca; operations manager, T. Fruet.

Taxi Aero.—P.O.B. 384, Sao Luiz, Maranhao.

This company flies local services from Sao Luiz. The fleet consists of D.H. Dragons and D.H. Rapides.

Varig (S.A. Empresa de Viacao Aerea Rio Grandense).—Avenida Borges de Medeiros (P.O. Box 243), Porto Alegre.

Varig was founded in 1927 and is the oldest airline in Brazil. It is 85% employee-owned, with the State Government holding 5% of the capital. Varig, in addition to a considerable domestic network, operates to New York, Montevideo, Buenos Aires, Port of Spain and Ciudad Trujillo.

The fleet consists of 12 Convair 240s, 21 DC-3s, 14 C-46s and five L-1049Gs. Two Boeing 707-420s and two S.A. Caravelles are on order (one already delivered).

President, Ruben M. Berta. Directors: maintenance, G. G. Herzfeldt; administration, O. Siebel, H. Schuetz and W. Heuer; traffic and sales, J. Rochedo; operations, L. Souza Pinto; instruction, R. Bordini; telecommunications, E. Peixoto; accounting, L. Zerwes; co-ordination, R. Schaly.

VASP (Viacao Aerea Sao Paulo S/A.).—Rua Libero Badaro 89, Sao Paulo.

VASP operates a shuttle service between Rio de Janeiro and Sao Paulo and to various points in south, north, west and central Brazil. It was formed in 1934, started operations in 1935, and is locally owned.

The fleet consists of 15 DC-3s, 16 Scandias, five Viscount 827s and one Beechcraft C-45.

Modified "Geographia" map.

The DC-3 is still the workhorse of the majority of the World's regional carriers. Here is one of three used by the Mexican operator, Trans Mar de Cortes, which also has an F-27.

President, Brig. Oswaldo Pamplona Pinto; vice-president, Dr. Marcello de Camargo Vidigal; executive director, Alfredo de Salles Oliveira Netto.

BRITISH GUIANA

British Guiana Airways (Government), 32 Main St., Georgetown.

Founded in 1939 by Maj. A. J. Williams, B.G.A. operates locally within British Guiana with Grumman Goose and DC-3s, and to the West Indian islands. In 1955 the government took over control and B.W.I.A. managed the operations. The St. Vincent Government Air Service is operated by one Grumman Goose on permanent charter.

The fleet in 1958 consisted of three DC-3s and three Goose G.21As.

General manager, Capt. G. P. Wood; technical manager, H. Wendt; commercial superintendent, A. G. Martins; accountant, E. Christian.

BRITISH HONDURAS

British Honduras Airways.—7 Cork Street (P.O. Box 186), Fort George, Belize.

Previously known as British Colonial Airlines, B.H.A. was formed in February, 1952. Under its new name it is a wholly owned subsidiary of B.W.I.A. but operates autonomously. It serves points within British Honduras. The fleet in 1958 consisted of two Cessna 170s and two Cessna 180s.

President, John L. Freiberg; vice-presidents, H. A. Freiberg, Jr., R. H. Eyles and T. S. Baker (manager).

BRITISH WEST INDIES

British West Indian Airways, Ltd.—Airways House, 17 Chacon Street (P.O. Box 604), Port of Spain, Trinidad, B.W.I.

The company was incorporated in June, 1948, and was the successor to one which had operated since 1942. Although the shares are entirely owned by B.O.A.C., the company has been independently operating from that time. Points served are Bermuda, Montego Bay and Kingston (Jamaica), San Juan, Antigua, Barbados, Caracas, British Guiana, British Honduras, Grand Cayman, St. Lucia, St. Kitts, St. Thomas, Grenada, Martinique, Miami, Trinidad and Tobago.

The present fleet consists of five Vickers Viscounts and three DC-3s.

Chairman, H. O. B. Wooding.

Q.C., C.B.E.; general manager, John H. Rahr; asst. general manager (technical), Capt. P. W. Kelshall; general sales manager, Basil F. Pantin; sales manager (Caribbean), John A. H. Kinch; personnel and industrial relations manager, E. J. Lange; chief accountant, Ronald B. Haseldine.

Cayman Brac Airways, Ltd.—Grand Cayman, B.W.I.

Using one Aero Commander 520, this airline operates over a 98-mile route between Grand Cayman and Cayman Brac. It was formed in 1955.

General manager and pilot, William Bigler; asst. mgr. and dispatcher, Norman Bodden; engineer, Benny Ross.

Leeward Islands Air Transport Service, Ltd.—Plymouth, Montserrat, B.W.I.

This company was formed in 1956 to provide local services among the smaller islands in the Leeward group. B.W.I.A. holds 51% of the capital. The fleet consists of a Piper Apache and a Beechcraft Twin Bonanza.

St. Vincent Government Air Service.—John H. Hazell, Sons and Co., Ltd., Kingston, St. Vincent, B.W.I.

Operates under charter from British Guiana Airways.

CHILE

Linea Aerea de Cobre, Ltda. (Ladeco).—Amunategui 73, Santiago.

Ladeco was formed in November, 1958, to take over the domestic operations of Cinta, Chilean Airlines. It is privately owned. The services (all scheduled) are mainly between mining centres and Santiago. The fleet consists of two DC-3s.

General manager, Juan Costabal; sales manager, Ignacio Bunster; technical manager, Kenneth T. Rosene.

LAN-Chile (Linea Aerea Nacional).—Los Cerrillos Airport, Santiago.

LAN-Chile was founded in 1929 by the Government, and operates domestic services to 33 cities and internationally to Buenos Aires, Mendoza and Rio Gallegos (Argentina), Montevideo (Uruguay), Lima (Peru), La Paz (Bolivia), Panama and Miami.

At the end of 1958 the fleet consisted of seven DC-6Bs, four Martin 202s and 17 DC-3s.

President, Adalberto Fernandez; general secretary, Huberto Duffau; operations manager, Rafael Salas; commercial manager, Hector M. Sauvageot; chief engineer, Sergio Salazar; traffic manager, Roberto Hirigoyen.

Transa de Chile, Ltda.—Office 21-23, 1161 Agustinas, Santiago.

Transa de Chile operates to Arica, Antofagasta and Punta Arenas. The fleet consists of three C-46s and two Cansos.

President, F. O. Devoto; exec. vice-president, M. C. Fischer.

COLOMBIA

Avianca (Aerovias Nacionales de Colombia, S.A.).—Carrera 7a, No. 16-14, Bogotá.

Avianca can claim to be the oldest airline in the Americas, since its predecessor, SCADTA, was formed in 1919 by German interests. Pan American obtained a major interest in 1930; it was partly nationalized and given its present name in 1940. Avianca operates to Miami, New York, Kingston, Montego Bay, San Juan (Puerto Rico), Lisbon, Madrid, Paris, Frankfurt, Panama, Caracas, Quito and Lima.

The fleet at the end of 1958 consisted of four L-1049Gs, 12 DC-4s and 31 DC-3s.

President, Juan Guillermo Restrepo Jaramillo; exec. vice-pres., Sabas Pretelt Martinez; technical vice-pres., Capt. Rafael Barvo; asst. president, Col. Herbert Boy; secretary-general, Julio Barriga; operations manager, Capt. Antonio Uribe.

Lloyd Aereo Colombiano, S.A.—Avenida Jimenez No. 5-57, P.O. Box 4904, Bogotá D.E.

Formed in August, 1954, LLACSA started operations in December with three C-46s. Daily services are operated to Barranquilla, Cartagena, Medellin, Cali y Periera and Miami. The fleet in 1958 consisted of one DC-3 and three C-46s.

One of Ladeco's two DC-3s at Rio Cisnes, Aysen, Chile, with the Andes in the background. These DC-3s have P. & W. 1830-94 engines for high-altitude operations.

President and general manager, Col. Roberto Esguerra; general traffic and sales manager, Jorge Chaves; administrative manager, Fernando Monroy; operations manager, Capt. Pedro Florez; maintenance manager, Roberto J. Porras.

Uraba, Medellin and Central Airways, Inc.—320 Carabobe, Medellin, and 135, East 42nd Street, New York 17, N.Y., U.S.A.

This is a subsidiary of P.A.W.A., and equipment is leased for operations between Panama and Colombia.

President, Erwin Balluder.

COSTA RICA

LACSA (Lineas Aereas Costarricenses S.A.)—Avenida 1A, Calle 3A (Apartado 1531), San Jose.

LACSA was founded in October, 1945, in affiliation with P.A.A. There is a 33⅓% Government participation. It serves points in Costa Rica, with external services to Miami, Cuba, Cayman, Mexico and Panama.

The fleet in 1958 consisted of two Convair 340s, three DC-3s and four C-46s.

President, Dr. Antonio Pena Chavarria; general manager, Francisco Bonilla; asst. general managers, Ricardo Pacheco and Otto Escalante; operations manager, Carl Holst.

CUBA

Aerovias "Q." S.A.—Clenfuegos 72, Havana.

This company operates to West Palm Beach, Key West and Nueva Gerona. It was formed in 1945. The fleet in 1958 consisted of two DC-4s and four C-46s.

President/general manager, M. Quevedo; traffic manager, M. Rodriquez; operations manager, J. E. A. de Regato.

Cia Cubana de Aviacion, S.A.—Aeropuerto Internacional, Rancho Boyeros, Havana.

Cubana's history goes back to 1929. Pan American acquired the outstanding stock in 1932, and from 1945 kept a 42% (later 20%) interest until 1954, when the company became an entirely Cuban enterprise. Regular transatlantic operations were started in April, 1948. Cubana operates domestic services and internationally to the U.S.A., Mexico, Haiti, Bermuda, the Bahamas and Spain.

The present fleet consists of three DC-3s, one L-049, three L-1049Gs, two Viscount 755s, three Viscount 818s and three Britannias. Two Boeing 707s are on order.

President and general manager, Genaro T. Hermida Rodriguez; secretary, Dr. Carlos M. D'Espaux Martinez; treasurer, Ignacio Calderin Perez. These are among the 12 members of the executive board. Executive staff includes: general traffic and sales manager, Oscar Bustillo Aixala; asst. gen. traffic and sales manager, Rigoberto Alvarez Castellon; sales manager, Cesar Facs Aguero; traffic manager, Armando Carvallo Aragon; personnel manager, Dr. Ruben Acosta Carrasco; operations manager, Oscar Madariaga Conejo; maintenance supt., Manuel Diaz Barbero.

DOMINICAN REPUBLIC

Compania Dominicana de Aviacion, S.A. — General Andrews Airport, Ciudad Trujillo.

Formed in 1944 by local interests and by P.A.A., this company operates services to Haiti, Miami and locally. The fleet in 1958 consisted of two DC-3s, five C-46s and one DHC Beaver.

President and general manager, C. A. McLaughlin.

ECUADOR

Cia Ecuatoriana de Aviacion, S.A.—Pasaje Amador B-7, Quito.

Ecuatoriana de Aviacion was formed in February, 1957. It operates services over the route Miami-Panama-Cali-Quito - Guayaquil - Lima-Santiago.

The fleet in 1958 consisted of one C-46 and one DC-6. One F-27 is on order.

President, Dr. Marco Tulio Gonzales; vice-president, Simón David Zevallos; operations manager, Maj. Alfredo Arteaga; traffic manager, Marcelo Burbano.

EL SALVADOR

TACA International Airlines S.A.—P.O. Box 428, Kenner, New Orleans, U.S.A.

TACA operates passenger and cargo services from New Orleans to Belize, Guatemala City, San Salvador, Tegucigalpa, Managua, San Jose and Panama. It was formed in 1939 by the TACA Corporation. The fleet consists of two Viscount 700s and two DC-4s.

President, Ricardo H. Kriete; exec. vice-pres., Enrique Sol; vice-pres., general manager, R. E. Clipson; sales mgr., G. J. McHugh; operations mgr., C. E. Taylor.

FRENCH GUIANA

Société Aérienne de Transport Guyane Antilles. — 12 Avenue du General de Gaulle, Cayenne, French Guiana.

SATGA operates local services in French Guiana. The fleet consists of D.H. Rapide, Vultee L-13 and Cessna.

GUATEMALA

Aviateca (Empressa Guatemalteca de Aviacion). — Avenida Hincapie, Aurora Airport, Guatemala City.

Aviateca was founded in 1939 and re-organized in 1945 as a government-owned undertaking. Scheduled, passenger and freight services are flown domestically. The fleet in 1958 consisted of five DC-3s, two DC-4s, two C-46s and a Norseman.

President, Col. A. Gemmell; operations manager, J. R. Mendoza.

HAITI

Cohata (Cie Haitienne de Transports Aériens).—Bowen Field, Port-au-Prince.

This military air transport organization was established in 1942. It operates services to the principal towns in the Republic. The fleet consists of DC-3s, and Beechcraft C-45s.

Commanding officer, Col. Georges Danache; asst. commdt., Lt.-Col. Yvon Boyer; operations manager, Lt.-Col. Pelissier Nicolas; sales manager, Maj. Joseph Ed. Etienne.

HONDURAS

Aerovias Nacionales de Honduras, S.A.—Tegucigalpa.

Using DC-3s, this airline operates services from Tegucigalpa via intermediate points to La Ceiba. It has taken over certain services previously operated by Servico Aereo de Honduras, S.A.

SAHSA (Servicio Aéreo de Honduras, S.A.).—Avenida Colon y 4a Calle, Tegucigalpa, D.C.

Founded in 1945 by private interests and Pan American, operations were begun by SAHSA in 1945. The company operates domestically within Honduras and to British Honduras, Guatemala and Salvador. SAHSA acquired TACA de Honduras in 1953 and merged its routes and equipment with those of SAHSA.

The fleet consists of six DC-3s and two C-46s.

President / general - manager, R. Zelaya R.; vice-pres., F. Powers; treasurer, F. Lardizabal.

TAN Airlines (Transportes Aereos Nacionales, S.A.).—Edificio Marichal, Tegucigalpa.

This private company was formed in 1947 as a cargo carrier. Scheduled passenger operations were started in 1950. TAN's routes now serve Miami, Cuba, El Salvador, Guatemala, Nicaragua, Ecuador and Peru. The fleet in 1958 consisted of five C-46s and a DC-6C.

President, M. Brooks; vice-pres., C. W. Shelton; secretary, R. Alvarez.

MEXICO

Aerolineas Mexicanas.—Pasco de la Reforma 52, Mexico 1, D.F.

This company operates locally. The fleet consists of DC-3s.

President, R. Alcantara; operations manager, R. Torres.

ABSA (Aeronaves de Balsas, S.A.).—2a Degollado, No. 109, Morelia, Michoacan.

ABSA operates domestically from Morelia and Mexico City. No other information is available.

Aeronaves de Mexico, S.A.—Ave. Mariano Escobedo No. 491, Mexico 5, D.F.

This company started operations in September, 1934, and now operates throughout Mexico and to New York. Since 1941 Aeronaves has bought four

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other companies, including Aerovias Reforma and Lineas Associadas Mexicanas.

The fleet at the end of 1958 consisted of two Britannia 302s, three L-749s, four Convair 340s, two DC-4s and 12 DC-3s.

President, Antonio Diaz Lombardo; exec. vice-pres., secretary, Miguel Aleman, Jr.; treasurer, José Rodolfo Garcia; admin. vice-pres. and assist. secretary, Carlos Giron; general manager, Carlos Ramos.

Cia Mexicana de Aviacon, S.A.—Balderas No. 36 (Apartado Postal 901), Mexico City.

Mexicana was incorporated in August, 1924, though non-scheduled flights were made before this date. Pan American, which took complete control in 1929, still retains a financial interest. International services are flown to Los Angeles, San Antonio (Texas), Chicago and Havana, Cuba.

The fleet at mid-1959 consisted of 15 DC-3As, four DC-3s (cargo), seven DC-4s, seven DC-6s and four Fairchild C-82 Packets (cargo). Three Comet 4Cs are on order.

President, A. Sáenz; vice-pres., P. A. Chapa and C. F. Osuna; treasurer, R. Ibarra; secretary, A. Flores; general manager, H. Max Healey; legal director, L. Andrade Pradillo; planning and development director, C. Nino de Rivera; sales manager, F. O. Willy; operations manager, M. Huerta; finance manager, M. Hernandez; maintenance manager, A. Grab; stations manager, I. Cedillos.

Guest Aerovias Mexico, S.A.—Paseo de la Reforma 51, Mexico City.

Founded by Winston Guest in 1946, this company operated an intercontinental service to Madrid in 1948-49 and now, after a gap of some years, operates again to Lisbon, Madrid and Paris. Services are operated to Miami and to Panama City and Carácas, Venezuela.

The fleet consists of L-749As and DC-6s.

President, Winston Guest; exec. vice-pres. and general manager, G. L. Monteiro.

Lineas Aereas de California, S.A.—Paseo de la Reforma 52-1, Mexico City.

Using C-46s this operator flies domestic services from Mexico City.

TAMSA (Transportes Aereos Mexicanos, S.A.).—Calle 62 No. 518, Merida, Yucatan.

Using DC-3s, TAMSA operates local services from Merida and to Belize, British Honduras.

Trans Mar de Cortes.—Calle Esquerro 30, Apartado Postal 149, La Paz, Baja California.

This company initiated freight and mail runs on a local basis in December, 1948. Passenger services were started a year later. In July, 1952, Lineas Aereos del Pacifico was acquired. Local services are operated. A service to Los Angeles is planned.

The fleet consists of three DC-3s and one F-27.

Director-manager, Mayo Obregón Tapia; general manager, Luis Coppola B.; asst. manager and controller, Arnulfo Garcia; operations manager, Tomas B. Lee; traffic manager, Manuel Urbina Z.; sales manager, Guillermo Escudero Lujan; maintenance supt., Arturo Armas.

NETHERLANDS GUIANA (SURINAM)

Surinaamse Luchtvaart Maatschappij, N.V.—Zorg en Hoop Airstrip, Paramaribo (P.O. Box 1029).

Government-owned but commercially operated Surinam Airways started operations in January, 1955. Scheduled services are flown within Surinam and charter flights to adjoining countries.

The fleet in 1958 consisted of two Cessna 170 Bs, one Cessna UC-78 and two Aero Commander 520s.

Manager, N. J. R. Zaal.

NICARAGUA

Lanica (Lineas Aereos de Nicaragua, S.A.).—Apartado Postal No. 753, Managua.

Pan American Airways holds a 40% interest in Lanica, which operates services throughout Nicaragua. It was formed in 1945.

The fleet in 1958 consisted of six DC-3s, two C-46s, a Beech and a Navion.

President, Col. L. A. Somoza.

PANAMA

Aerovias Panama Airways.—Calle B No. 1, El Cangrejo, Panama City.

The predecessor of this company (Aerovias Interamericana de Panama) was founded in 1951 as a cargo and passenger carrier. APA now operates between Panama City, Kingston, Havana, Miami, and Lima. The fleet consists of DC-4s.

General manager, C. R. Howell; superintendent, maintenance and operations, D. B. Sittman; comptroller, A. D. Susi; general traffic and sales manager, J. D. Sotis.

Copa (Cia Panamena de Aviacion, S.A.).—Apartado 1572, Panama City.

Copa was founded in 1946 and now operates within the Republic of Panama to David, Armuelles, Bocas del Toro and Tocumen and externally to San José, Costa Rica.

The fleet consists of two C-46s and two DC-3s.

President, Dr. Carlos Icaza; secretary, Camilo Quelquejeu; general manager, Emilio F. Clare.

PERU

Aerolineas Peruanas, S.A.—Nicolas de Pierola 700, Lima.

This carrier operates between Lima, Antofagasta, Santiago and Buenos Aires. The fleet consists of C-46s.

Cia de Aviacion "Faucett," S.A.—Jirón Unión 926 (Hotel Bolivar Building), Lima.

Established in September, 1928, this is one of the oldest airlines in Latin America. Its founder is still honorary president. Services are flown to the main centres in Peru. The fleet at mid-1958 consisted of four Stinson-Faucetts, four C-47s, four DC-3s and four DC-4s.

Honorary president, Elmer J. Faucett; president, Eduardo Dibós; managing director, Antonio Bentin.

Transportes Aereos Peruanas, S.A.—Paleo Colon 266, Lima.

This carrier operates local services within Peru using C-46s.

PUERTO RICO

Caribbean Atlantic Airlines, Inc.—P.O. Box 6035, Loiza Station, Santurce.

Incorporated in February, 1939, Caribair operates from San Juan to Ponce, Mayaguez, the Virgin Islands, St. Martin, B.W.I., and Dominica. The fleet consists of seven DC-3s.

President, D. Trigo; vice-pres., B. Trigo; vice-pres., operations, J. M. Sierra; treasurer, L. A. Lockhart; secretary, A. Valdes; vice-pres., traffic, R. B. Forrest.

URUGUAY

CAUSA (Cia Aeronautica Uruguay, S.A.).—Calle Colonia 1068, Montevideo.

Formed in 1936, and starting operations with Ju-52 floatplanes, CAUSA flies services between Colonia and Montevideo and Buenos Aires using three Short Sandringham flying-boats.

President, J. A. Beisso; managing director, T. L. Borges; secretary, O. M. Rodriguez.

PLUNA (Primeras Lineas Uruguayas de Navegacion Aerea).—1013 Colonia esq. Agraciada, Montevideo.

Formed in 1935 by Uruguayan interests, PLUNA was reorganized in 1944 as a "mixed economy" company—83% Government-owned and 17% private interest. Since 1951 it has been owned entirely by the Government. It operates domestically and internationally to points in Argentina, Paraguay, Bolivia and Brazil.

The fleet includes six DC-3s and three Viscount 769Ds.

President, Silvestre O. Landoni; general manager, R. Langon; asst. general manager, J. Oliver de la Torre.

VENEZUELA

Avensa (Aerovias Venezolanas, S.A.).—Apartado de Correos 943, Carácas.

Avensa was founded in July, 1943, 30% of the capital being owned by Pan American and 70% by Venezuelan citizens. Services include international runs to Montego Bay (Jamaica) and Miami, and to New Orleans. At mid-1959, the fleet consisted of two DC-6Bs, two Convair 440s, five Convair 340s, 12 DC-3s, three C-46s and five F-27s.

President, H. L. Boulton; acting president and general manager, A. Boulton; vice-pres. and assts. to the president, H. L. Boulton, Jr., and G. Ochoa Tucker; vice-pres., R. van den Branden; operations manager, Harry Gibson; traffic and sales manager, A. Carvallo Ganteaume.

Linea Aeropostal Venezolanas.—Bloque 1, El Silencio, Carácas.

Formed in 1926, L.A.V. is government-owned. The first international service was flown in 1947 on the New York run. In 1954 the international network was extended to Europe (Madrid and Rome). Southwards services are flown to Lima, Peru.

The fleet at the end of 1958 consisted of six L-1049s, one L-749, three Viscounts, two Martin 202s, four C-46s and 29 DC-3s.

President, Hector Font Viale-Rigo; first vice-pres., Luis Paul; sales and traffic manager, Oscar Aguerrevere.

RANSA (Rutas Aereas Nacionales, S.A.).—West End N.W. 36th Street (P.O. Box 625), Miami, Florida, and 407 Edificio America, Carácas.

Founded in 1948, RANSA is an all-cargo carrier operating between Miami and Venezuela. The fleet includes 13 C-46s and one DC-3.

President, C. Chaves; general manager, E. Pardey; operations manager, R. D. Borges.

ASIA

ADEN

Aden Airways, Ltd.—Khormaksar, Aden, Arabia.

This is now a subsidiary of B.O.A.C. Associated Companies and took over the Cairo-based services of the Corporation when it was formed as a subsidiary in October, 1949. Aden Airways' more important route points are Nairobi, Mombasa, Bahrein, Asmara, Hargeisa (Somaliland), Djibouti and Khartoum.

The fleet consists of seven DC-3s.

General manager, H. W. C. Alger; secretary and commercial manager, D. F. Classey; chief accountant, G. Morello; chief engineer, G. G. Farnsworth; staff and admin. manager, H. Peck.

AFGHANISTAN

Ariana Afghan Airlines Co., Ltd.—P.O. Box 76, Kabul.

This company was formed in 1955. It is owned 51% by various Afghan banks and Government institutions and 49% by Pan American World Airways, Inc. Ariana operates domestic services to five major points in Afghanistan and international services to Delhi, Amritsar, Karachi, Bahrein, Teheran, Damascus, Beirut, Ankara, Prague and Frankfurt.

The fleet consists of two DC-4s and four DC-3s.

President, Faiz Mohammed Ahmedzai; vice-president, Francis J. Swayze; secretary, Mohammed Aslam; comptroller, Bjarne Ferdinandsen.

BORNEO

Borneo Airways, Ltd.—Labuan, N. Borneo.

Borneo Airways was formed in 1957, by the Governments of Sarawak, North Borneo and Brunei, as part of the reorganization of Malayan Airways. B.O.A.C. Associated Companies, with Malayan Airways, hold 49% of the shares, whilst the remaining 51% are held by the three Governments. Scheduled services are operated within North Borneo, Brunei and Sarawak connecting with the mainline services operated by Malayan Airways and Cathay Pacific Airways.

The fleet consists of three D.H. Rapides and three Scottish Aviation Twin Pioneers.

Chairman, D. E. M. Fiennes; managing pilot, Capt. T. M. Robertson; commercial supt., J. McLean; secretary, A. A. Cooper.

BURMA

Union of Burma Airways.—104 Strand Road, Rangoon.

The Union of Burma Airways Board was formed and started operations in October, 1948, with capital advanced by the Government of Burma. U.B.A. serves points within the country and flies externally to Calcutta, East Pakistan, Penang, Singapore and Bangkok.

The fleet in 1958 included 10 DC-3s, three D.H. Doves, two Marathons, one PBY-5A and three Viscount 761s.

Chairman, U. Chit; director and general manager, U. Taw; superintendent engineering, B. G. Jones.

CAMBODIA

Royal Air Cambodge.—151 Vithei Dekcho Damdin, P.O.B. 539, Phnom-Penh.

The Cambodian national airline started operations in November, 1956, and flies services within Cambodia and to Saigon, Thailand and Hong Kong. The fleet consists of DC-3s and an L-1049.

Chairman, Huot Sam Ath; general manager, Jean Florent.

CEYLON

Air Ceylon, Ltd.—Airlines Booking Centre, York Street, Colombo 1.

In 1951 Air Ceylon, which had been operating since 1947, became a corporation, participants being the Ceylon Government (51%) and Australian National Airways (49%). K.L.M. became a partner in February, 1956, after A.N.A. had dropped out, and services to Singapore, Amsterdam and London are now operated.

At mid-1959 the fleet consisted of two DC-3s and one L-1049G.

Managing director, J. L. M. Fernando; dep. managing director, F. G. A. van Moll; manager, traffic and sales, Kenneth de Croos; accountant, F. B. W. Goonewardena; mgr., engineering/chief engineer, W. A. E. Molamure; mgr., operations/chief pilot, Capt. S. J. P. Fernando.

CHINA

Civil Aviation Administration of China.—15 Ch'ang An Street (East), Peking, Republic of China.

C.A.A.C. operates services between Peking, Mukden and Irkutsk and a large-area domestic network. It was known as Skoga until 1954, when Soviet participation ceased, though services are still flown in co-operation with Aeroflot. The fleet includes Il-14s, Il-12s and Li-2s.

FORMOSA

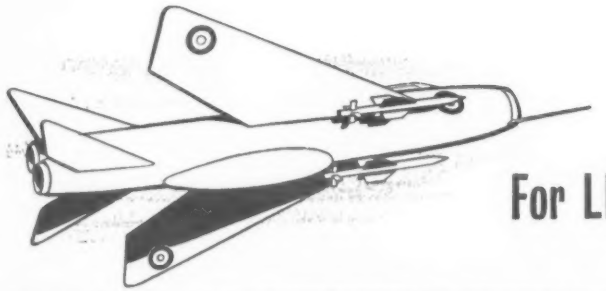
Civil Air Transport.—46 Chung Shan Road, North 2nd Section, Taipei.

C.A.T. was formed in October, 1946, by the late Gen. C. L. Chennault. Headquarters were moved from China to Formosa in November, 1949. Services are flown to Tokyo, Seoul, Okinawa, Hong Kong, Manila and Bangkok, and domestically within Formosa.

The fleet consists of one DC-6B, two DC-4s, five DC-3s, 22 C-46s and two Catalinas.

Chairman, Wang Wensan; president and general manager, Hugh L.

(*Continued on page* 481)



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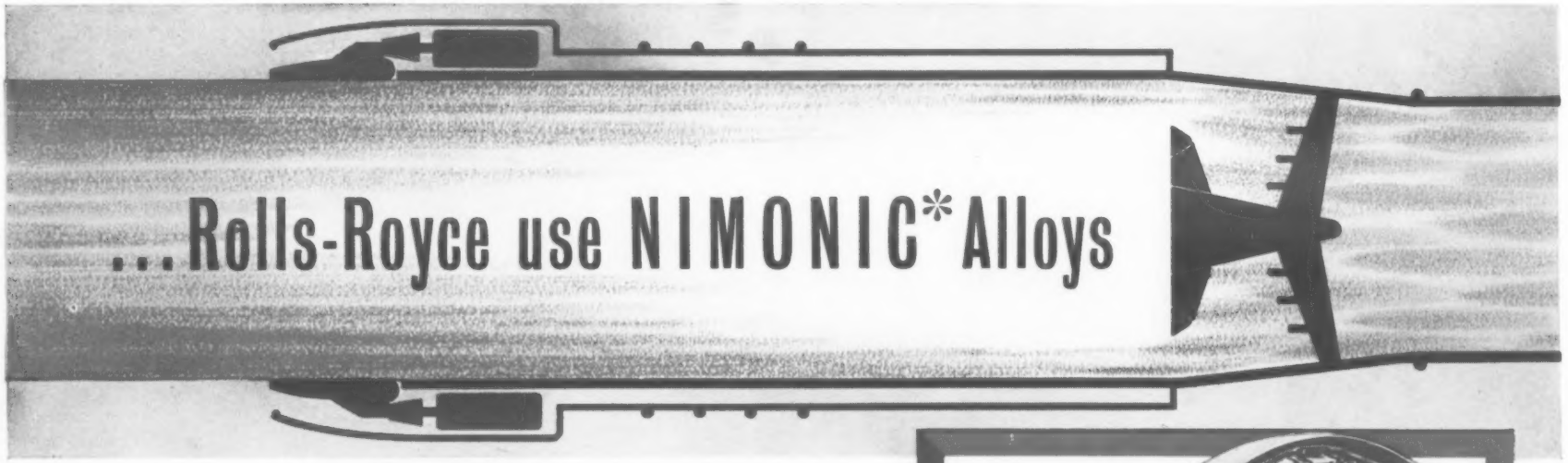

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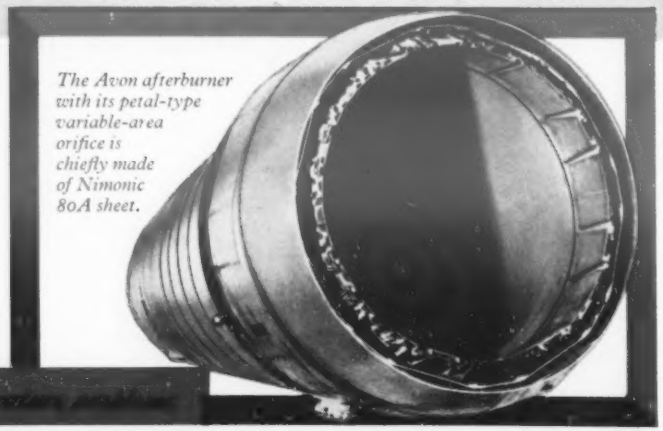

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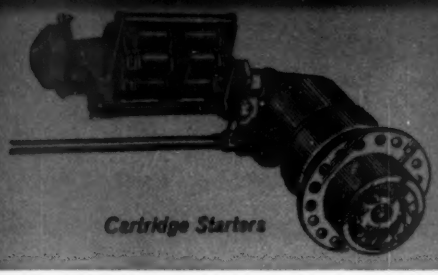
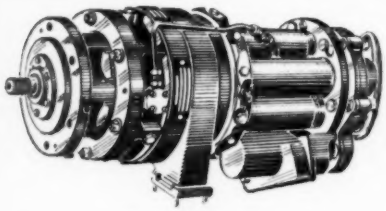


Cartridge Starters



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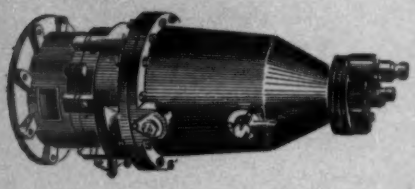

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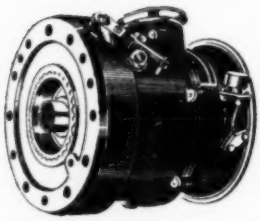
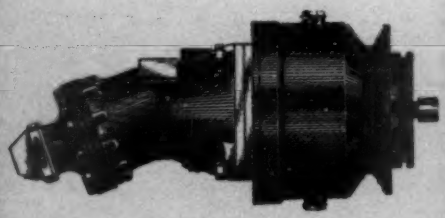
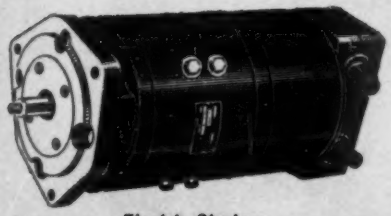


Low Pressure Air Starters



Hydraulic Starters



Electric Starters

Starter Generators

Guide to the World's Airlines

(Continued from page 480)

Grundy. Vice-presidents: asst. general manager, C. J. Rosbert; operations, R. E. Rousselot; general affairs, H. K. Yuan; technical services, Alan Wueste; traffic and sales, Var M. Green. Secretary-legal counsel, Clyde S. Carter; treasurer-controller, Amos Hiatt.

HONG KONG

Cathay Pacific Airways, Ltd.—1 Connaught Road, Central (P.O. Box 4), Hong Kong.

C.P.A. was formed in 1946 and reorganized in 1948, when John Swire and Sons and their associated shipping interests, and Australian National Airways, secured 80% of the shares. In 1959 Hong Kong Airways was merged with C.P.A. and B.O.A.C. Associated Companies now hold 15% of the capital, the remainder being held by the C.P.A. and H.K.A. shareholders. Services are operated to Manila, Sydney, Tokyo, Taipei, Vientiane, Saigon, Bangkok, Singapore, Rangoon and Calcutta.

The fleet consists of one DC-6B, one DC-6, one DC-4, one DC-3 and two Lockheed Electras.

Chairman, W. C. G. Knowles; managing director, W. B. Rae-Smith; commercial manager, D. R. Y. Bluck; operations manager, Capt. K. W. Steele; engineering director, J. T. Gething.

INDIA

Air-India International Corporation, New India Assurance Bldg., Mahatma Gandhi Road, Bombay, 1.

Air-India International was formed in June, 1948, with the Government of India holding 49% of the shares. Under the Air Corporations Act it became a wholly Government-owned Corporation on August 1, 1953. A.I.I. now flies seven times a week to London from Bombay, three times a week to Tokyo, once a week to Sydney, twice a week to Dakarta, twice a week to Nairobi and once a week to Moscow via Tashkent. A weekly all-cargo service between London and Bombay is also operated.

The fleet consists of nine L-1049s and one DC-4. Three Boeing 707 Intercontinentals are on order for delivery early 1960.

Chairman, J. R. D. Tata; vice-chairman and general manager, B. R. Patel; technical director, A. C. Gazdar; commercial director, S. K. Kooka; financial controller, N. J. Pavri; controller of stores and purchases, A. M. Kelkar; chief administrative officer, R. Doraiswamy; personnel manager, A. S. Banavalikar; secretary, R. N. Gundil.

Indian Airlines Corporation.—Thapar House, Jan Path, New Delhi.

I.A.C. was formed on August 1, 1953, as a State Corporation. It is a primarily domestic operator, but services are also flown into Afghanistan, East and West Pakistan, Nepal, Burma and Ceylon. The operations of the Corporation are divided into three areas—Delhi, Bombay and Calcutta. Each area is in charge of a manager, who is responsible for the proper administration and co-ordination between different departments in the area.

At mid-1959 the fleet consisted of 10 Viscounts, five DC-4s, 58 DC-3s, 12 Vikings and seven D.H. Herons.

Chairman, V. Shankar, I.C.S.; general manager, Air Cdre. P. C. Lal, D.F.C.; financial comptroller, J. S. Parakh; chief traffic manager, Biren Mukerji; engineering manager, T. D. Kumar; chief operations and training manager, Capt. J. M. Engineer; controller of stores, C. L. Kejriwal; chief administrative officer, Brig. N. S. Rawat; chief audit officer, Kripal Chand. Area managers: Capt. R. P. Huilgol (Delhi); Capt. D. A. Samant (Bombay); Dr. H. M. Wadia (Calcutta).

INDO-CHINA

Air Laos Transports Aériens.—4 Rue Pierre Morin (P.O. Box 87), Vientiane, Laos.

This company was formed in 1952 by Air France (30%), Aigle Azur (20%) and local interests (50%). It operates domestically and to Saigon, Bangkok and Hong Kong.

In 1958 the fleet consisted of six DC-3s, two Bristol 170s, two Stratoliners, two D.H.C. Otters and one D.H.C. Beaver.

Air Vietnam, — 116 Boulevard Nguyen-Hue (P.O. Box 217), Saigon, Vietnam.

Formed in October, 1951, Air Vietnam is a joint French-Vietnamese Government concern. It operates internally and to Laos, Cambodia and Thailand. In pool with Air France, services are also flown to Paris and Hong Kong.

The fleet at mid-1959 consisted of six DC-3s and one DC-4.

President, Nguyen Van Khai; vice-pres., M. Bruyant; general manager, Nguyen Tan Trung.

INDONESIA

Garuda Indonesian Airways, N.V.—15 Dialan Nusantara, Dakarta.

Services in Indonesia were originally operated by K.N.I.L.M. and afterwards by K.L.M.'s Inter Insulair Division. In 1949 the Division was replaced by a new company, in which the Indonesian Government and K.L.M. each held 50% of the shares. The Government later purchased all K.L.M. shares and since March 31, 1954, Garuda has been a national company, though K.L.M. still provides technical assistance. Garuda operates domestically and externally to Bangkok, Singapore and Manila.

The fleet consists of three Convair 440s, eight Convair 340s, eight Convair 240s and DC-3s. Three Lockheed Electras are on order.

President, Dr. M. Soetoto; exec. vice-presidents, Dr. R. Sugoto and Dr. C. A. Mochtar; vice-pres., Dr. Yap Kie Tik. There is a six-member board of control.

IRAQ

Iraqi Airways.—Iraqi Republic Railways, Baghdad West.

Iraqi Airways was formed in 1945 as a subsidiary of Iraqi State Railways. Services were started the following year between Baghdad, Damascus and Beirut. Additional routes were subsequently opened to Kuwait, Bahrain, Teheran, Cairo, Amman, Mosul, Aleppo, Istanbul, Athens, Vienna, Rome and London. B.O.A.C. provides on secondment, some flight crews and technical personnel.

The fleet in 1958 consisted of four Viscounts, three Vikings and a D.H. Dove.

Manager, Brig. Jassam Mohammed; deputy manager, Mohammed Saleh El-Bayati; chief pilot, Capt. T. M. Walters.

ISRAEL

Arkia—Israel Inland Airlines, Ltd.—42 Maze St. (P.O.B. 843), Tel Aviv.

Arkia was founded in 1950 by El Al and the Jewish Federation of Labour to operate domestic services. El Al furnished technical assistance and was in charge of operations. Since 1956 Arkia has operated under its own management.

The fleet in 1958 consisted of four DC-3s.

Managing director, Jacob Hozman; technical manager, Lew Bigon.

El Al—Israel Airlines, Ltd.—76 Maze Street, Tel Aviv.

Formed in May, 1948, with 63% Government participation, El Al started weekly flights to Europe in 1949. Services were later started, via European centres, to New York, to Nairobi and Johannesburg and to Turkey. El Al introduced Britannias on the North Atlantic route in December, 1957.

The fleet at the end of 1958 consisted of three L-049s, one L-149 and four Britannia 313s.

Chairman and managing director, Brig.-Gen. E. Ben-Arzi. Divisional directors: production and operations, Y. Paigi; commercial, A. Rywkind; director, admin. and finance, H. Sanderson.

JAPAN

All Nippon Airways Co., Ltd.—Hiko-Kan Bldg., Tamura-cho, Shiba, Minato-ku, Tokyo.

This domestic operating company was formed in December, 1952, and merged with Far Eastern Airlines and Japan Helicopter and Airplane Transports Co., in March, 1958.

The fleet consists of two Convair 440s, nine DC-3s, three D.H. Herons, four D.H. Doves, two Miles Marathons and eight Bell helicopters. On order are three F-27s and three Viscount 810s.

Chairman, M. Midoro; exec. managing director, K. Nakano.

Japan Air Lines Co., Ltd.—Tokyo Building, 2-Chome Marunouchi Chiyoda-ku, Tokyo.

The present Japan Air Lines was formed in October, 1953, absorbing the old J.A.L., which was established in August, 1951, with private capital. The Japanese Government now shares the capital jointly with the previous owners. International services are flown to the U.S. West Coast, Formosa, Hong Kong, Bangkok, Okinawa, and Singapore. Trunk services throughout Japan are also operated.

The fleet consists of 10 DC-4s, five DC-6Bs and four DC-7Cs. Four DC-8s are on order.

President, Seijiro Yanagita; vice-pres., Shizuma Matsuo. Managing directors; sales and traffic, Yoshito Kojima; operations, Tetsuo Oba; general affairs, Kikue Urashima; finance and property, Kinjiro Yuchi; planning and public relations, Ryohei Ito.

JORDAN

Air Jordan Co., Ltd.—P.O. Box 274, Amman.

Air Jordan Co., Ltd., of the Holy Land—to use its full title—was formed on December 1, 1958, as the successor to Air Jordan Co., Ltd., and Arab Airways (Jerusalem), Ltd., which were merged. The original Air Jordan was formed in 1950 and Transocean Air Lines has the management contract as well as a financial interest. Services are operated from Jerusalem and Amman to Beirut, Kuwait, Jeddah, Dhahran, Cairo, Aqaba and Damascus. In October a direct Amman-Rome service was opened.

The fleet at mid-1959 consisted of two DC-4s, two Convair 240s, one C-46 and one DC-3.

General manager, Abdul Muti el-Qutob; exec. director, W. R. Rivers; director of traffic and sales, Walter B. McCarthy; director of operations, G. R. Morris; director of maintenance, T. E. Weaver.

Arab Airways (Jerusalem), Ltd.
Merged with Air Jordan.

Modified "Geographia" map.

Arkia Airways (Jerusalem), Ltd.
Merged with Air Jordan.

KOREA (NORTH)

UKAMPS (Ministry of Communications of Korean Democratic Republic).—Prospekt Stalina, Pyong-yang, Republic of Korea.

Previously known as Sokao, services are flown in collaboration with Aeroflot. Sokao was founded in 1950 and, after the Korean War, resumed services in 1953. Ukamps' services link up with those of Aeroflot. The fleet consists of Li-2s.

KOREA (SOUTH)

Korean National Airlines.—No. 1, First Street, Chyong-no District, Seoul, Korea.

Formed by the Ministry of Transport in 1947, K.N.A. resumed operations in 1952 after the Korean War. It now operates over a small domestic network and to Hong Kong. The fleet in 1958 consisted of three DC-3s and one DC-4.

President, Y. W. Shinn; managing director, M. Kirk; chief engineer, M. McCormick.

LEBANON

Air Liban.—P.O. Box 1243, Beirut.

Formerly Compagnie Générale de Transport, Air Liban was founded in 1945 and operations started in 1946. The present name was adopted in March, 1951. Services are flown to all main Middle East centres and to Ankara, Paris, Tripoli, Dakar, Khartoum, Kano, Lagos, Accra and Abidjan.

The fleet consists of three DC-6Cs, one DC-4 and three DC-3s.

Director general, Henry Naccache; technical advisor, Victor Poirier.

Lebanese International Airways.—Abouchalach Building, Verdun Street, Beirut.

L.I.A. first operated with C-46s between Beirut and Kuwait. It is backed by Sabena and now operates to Dhahran, Teheran, Kuwait, Doha, Bahrain, Baghdad, Milan, Paris and Brussels.

The fleet consists of one DC-6 and two DC-4s.

President, A. Arida; general manager, Cmd. J. van Rooyen; admin. manager, J. C. Urbain; commercial manager, A. Eid.

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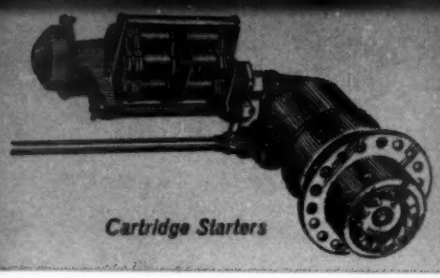

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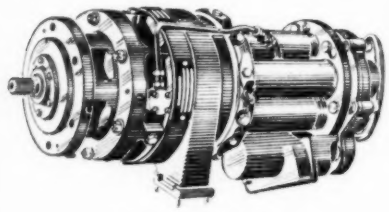

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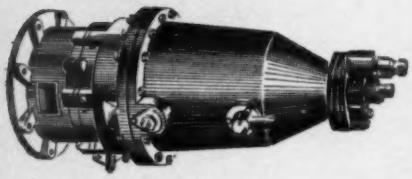
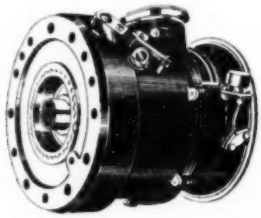


Liquid Fuel Starters



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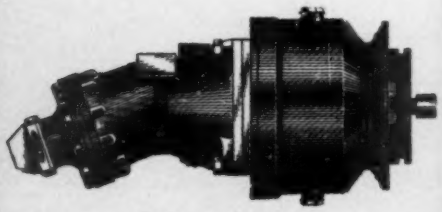

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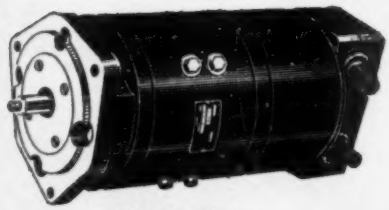
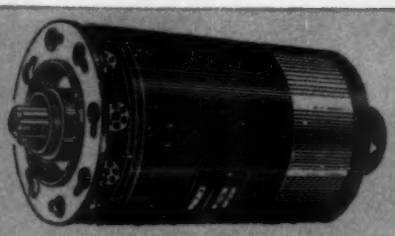


Electric Starters



Starter Generators

Guide to the World's Airlines

(Continued from page 480)

Grundy. Vice-presidents: asst. general manager, C. J. Rosbert; operations, R. E. Rousseaux; general affairs, H. K. Yuan; technical services, Alan Wueste; traffic and sales, Var M. Green. Secretary-legal counsel, Clyde S. Carter; treasurer-controller, Amos Hiatt.

HONG KONG

Cathay Pacific Airways, Ltd.—1 Connaught Road, Central (P.O. Box 4), Hong Kong.

C.P.A. was formed in 1946 and reorganized in 1948, when John Swire and Sons and their associated shipping interests, and Australian National Airways, secured 80% of the shares. In 1959 Hong Kong Airways was merged with C.P.A. and B.O.A.C. Associated Companies now hold 15% of the capital, the remainder being held by the C.P.A. and H.K.A. shareholders. Services are operated to Manila, Sydney, Tokyo, Tairei, Vientiane, Saigon, Bangkok, Singapore, Rangoon and Calcutta.

The fleet consists of one DC-6B, one DC-6, one DC-4, one DC-3 and two Lockheed Electras.

Chairman, W. C. G. Knowles; managing director, W. B. Rae-Smith; commercial manager, D. R. Y. Black; operations manager, Capt. K. W. Steele; engineering director, J. T. Gething.

INDIA

Air-India International Corporation.—New India Assurance Bldg., Mahatma Gandhi Road, Bombay, 1.

Air-India International was formed in June, 1948, with the Government of India holding 49% of the shares. Under the Air Corporations Act it became a wholly Government-owned Corporation on August 1, 1953. A.I.I. now flies seven times a week to London from Bombay, three times a week to Tokyo, once a week to Sydney, twice a week to Djakarta, twice a week to Nairobi and once a week to Moscow via Tashkent. A weekly all-cargo service between London and Bombay is also operated.

The fleet consists of nine L-1049s and one DC-4. Three Boeing 707 Intercontinentals are on order for delivery early 1963.

Chairman, J. R. D. Tata; vice-chairman and general manager, B. R. Patel; technical director, A. C. Gazdar; commercial director, S. K. Kooka; financial controller, N. J. Pavri; controller of stores and purchases, A. M. Kelkar; chief administrative officer, R. Doraiswamy; personnel manager, A. S. Banavalikar; secretary, R. N. Gundil.

Indian Airlines Corporation.—Tharpar House, Jan Path, New Delhi.

I.A.C. was formed on August 1, 1953, as a State Corporation. It is a primarily domestic operator, but services are also flown into Afghanistan, East and West Pakistan, Nepal, Burma and Ceylon. The operations of the Corporation are divided into three areas—Delhi, Bombay and Calcutta. Each area is in charge of a manager, who is responsible for the proper administration and co-ordination between different departments in the area.

At mid-1959 the fleet consisted of 10 Viscounts, five DC-4s, 58 DC-3s, 12 Vikings and seven D.H. Herons.

Chairman, V. Shankar, I.C.S.; general manager, Air Cdre. P. C. Lal, D.F.C.; financial comptroller, J. S. Parakh; chief traffic manager, Biren Mukerji; engineering manager, T. D. Kumar; chief operations and training manager, Capt. J. M. Engineer; controller of stores, C. L. Keriwal; chief administrative officer, Brig. N. S. Rawat; chief audit officer, Kripal Chand. Area managers: Capt. R. P. Huilgol (Delhi); Capt. D. A. Samant (Bombay); Dr. H. M. Wadia (Calcutta).

INDO-CHINA

Air Laos Transports Aeriens.—4 Rue Pierre Morin (P.O. Box 87), Vientiane, Laos.

This company was formed in 1952 by Air France (30%), Aigle Azur (20%) and local interests (50%). It operates domestically and to Saigon, Bangkok and Hong Kong.

In 1958 the fleet consisted of six DC-3s, two Bristol 170s, two Stratoliners, two D.H.C. Otters and one D.H.C. Beaver.

Air Vietnam.—116 Boulevard Nguyen-Hue (P.O. Box 217), Saigon, Vietnam.

Formed in October, 1951, Air Vietnam is a joint French-Vietnamese Government concern. It operates internally and to Laos, Cambodia and Thailand. In pool with Air France, services are also flown to Paris and Hong Kong.

The fleet at mid-1959 consisted of six DC-3s and one DC-4.

President, Nguyen Van Khai; vice-pres., M. Bruyant; general manager, Nguyen Tan Trung.

INDONESIA

Garuda Indonesian Airways, N.V.—15 Dialan Nusantara, Djakarta.

Services in Indonesia were originally operated by K.N.I.L.M. and afterwards by K.L.M.'s Inter-Insular Division. In 1949 the Division was replaced by a new company, in which the Indonesian Government and K.L.M. each held 50% of the shares. The Government later purchased all K.L.M. shares and since March 31, 1954, Garuda has been a national company, though K.L.M. still provides technical assistance. Garuda operates domestically and externally to Bangkok, Singapore and Manila.

The fleet consists of three Convair 440s, eight Convair 340s, eight Convair 240s and DC-3s. Three Lockheed Electras are on order.

President, Dr. M. Sjoetoto; executive vice-presidents, Dr. R. Suhoto and Dr. C. A. Mochtar; vice-pres., Dr. Yap Kie Tik. There is a six-member board of control.

IRAQ

Iraqi Airways.—Iraqi Republic Railways, Baghdad West.

Iraqi Airways was formed in 1945 as a subsidiary of Iraqi State Railways. Services were started the following year between Baghdad, Damascus and Beirut. Additional routes were subsequently opened to Kuwait, Bahrain, Teheran, Cairo, Amman, Mosul, Aleppo, Istanbul, Athens, Vienna, Rome and London. B.O.A.C. provides on secondment some flight crews and technical personnel.

The fleet in 1958 consisted of four Viscounts, three Vikings and a D.H. Dove.

Manager, Brig. Jassam Mohammed; deputy manager, Mohammed Salch El-Bayati; chief pilot, Capt. T. M. Walters.

ISRAEL

Arkia—Israel Inland Airlines, Ltd.—42 Maze St. (P.O.B. 843), Tel Aviv.

Arkia was founded in 1950 by El Al and the Jewish Federation of Labour to operate domestic services. El Al furnished technical assistance and was in charge of operations. Since 1956 Arkia has operated under its own management.

The fleet in 1958 consisted of four DC-3s.

Managing director, Jacob Hozman; technical manager, Lew Bigon.

El Al—Israel Airlines, Ltd.—76 Maze Street, Tel Aviv.

Formed in May, 1948, with 61% Government participation, El Al started weekly flights to Europe in 1949. Services were later started via European centres, to New York, to Nairobi and Johannesburg and to Turkey. El Al introduced Britannias on the North Atlantic route in December, 1957.

The fleet at the end of 1958 consisted of three L-049s, one L-149 and four Britannia 313s.

Chairman and managing director, Brig.-Gen. E. Ben-Arzi. Divisional directors: production and operations, Y. Palgi; commercial, A. Ryvkind; director, admin. and finance, H. Sanderson.

JAPAN

All Nippon Airways Co., Ltd.—Hiko-Kan Bldg., Tamura-cho, Shiba, Minato-ku, Tokyo.

This domestic operating company was formed in December, 1952, and merged with Far Eastern Airlines and Japan Helicopter and Airplane Transports Co., in March, 1958.

The fleet consists of two Convair 440s, nine DC-3s, three D.H. Herons, four D.H. Doves, two Miles Marathons and eight Bell helicopters. On order are three F-27s and three Viscount 810s.

Chairman, M. Midoro; exec. managing director, K. Nakano.

Japan Air Lines Co., Ltd.—Tokyo Building, 2-Chome Marunouchi Chiyoda-ku, Tokyo.

The present Japan Air Lines was formed in October, 1953, absorbing the old J.A.L., which was established in August, 1951, with private capital. The Japanese Government now shares the capital jointly with the previous owners. International services are flown to the U.S. West Coast, Formosa, Hong Kong, Bangkok, Okinawa, and Singapore. Trunk services throughout Japan are also operated.

The fleet consists of 10 DC-4s, five DC-6Bs and four DC-7Cs. Four DC-8s are on order.

President, Seijiro Yanagita; vice-pres., Shizuma Matsuo. Managing directors: sales and traffic, Yoshito Kojima; operations, Tetsuo Oba; general affairs, Kikue Urashima; finance and property, Kinjiro Yuchi; planning and public relations, Ryohei Ito.

JORDAN

Air Jordan Co., Ltd.—P.O. Box 274, Amman.

Air Jordan Co., Ltd., of the Holy Land—to use its full title—was formed on December 1, 1958, as the successor to Air Jordan Co., Ltd., and Arab Airways (Jerusalem), Ltd., which were merged. The original Air Jordan was formed in 1950 and Transocean Air Lines has the management contract as well as a financial interest. Services are operated from Jerusalem and Amman to Beirut, Kuwait, Jeddah, Dhahran, Cairo, Aqaba and Damascus. In October a direct Amman-Rome service was opened.

The fleet at mid-1959 consisted of two DC-4s, two Convair 240s, one C-46 and one DC-3.

General manager, Abdul Muti el-Qutob; exec. director, W. R. Rivers; director of traffic and sales, Walter B. McCarthy; director of operations, G. R. Morris; director of maintenance, T. E. Weaver.

Arab Airways (Jerusalem), Ltd.—Merged with Air Jordan.

KOREA (NORTH)

UKAMPS (Ministry of Communications of Korean Democratic Republic).—Prospekt Stalina, Pyong-yang, Republic of Korea.

Previously known as Sokao, services are flown in collaboration with Aeroflot. Sokao was founded in 1950 and, after the Korean War, resumed services in 1953. Ukamps' services link up with those of Aeroflot. The fleet consists of Li-2s.

KOREA (SOUTH)

Korean National Airlines.—No. 1, First Street, Chyong-no District, Seoul, Korea.

Formed by the Ministry of Transport in 1947, K.N.A. resumed operations in 1952 after the Korean War. It now operates over a small domestic network and to Hong Kong. The fleet in 1958 consisted of three DC-3s and one DC-4.

President, Y. W. Shinn; managing director, M. Kirk; chief engineer, M. McCormick.

LEBANON

Air Liban.—P.O. Box 1243, Beirut.

Formerly Compagnie Générale de Transport, Air Liban was founded in 1945 and operations started in 1946. The present name was adopted in March, 1951. Services are flown to all main Middle East centres and to Ankara, Paris, Tripoli, Dakar, Khartoum, Kano, Lagos, Accra and Abidjan.

The fleet consists of three DC-6Cs, one DC-4 and three DC-3s.

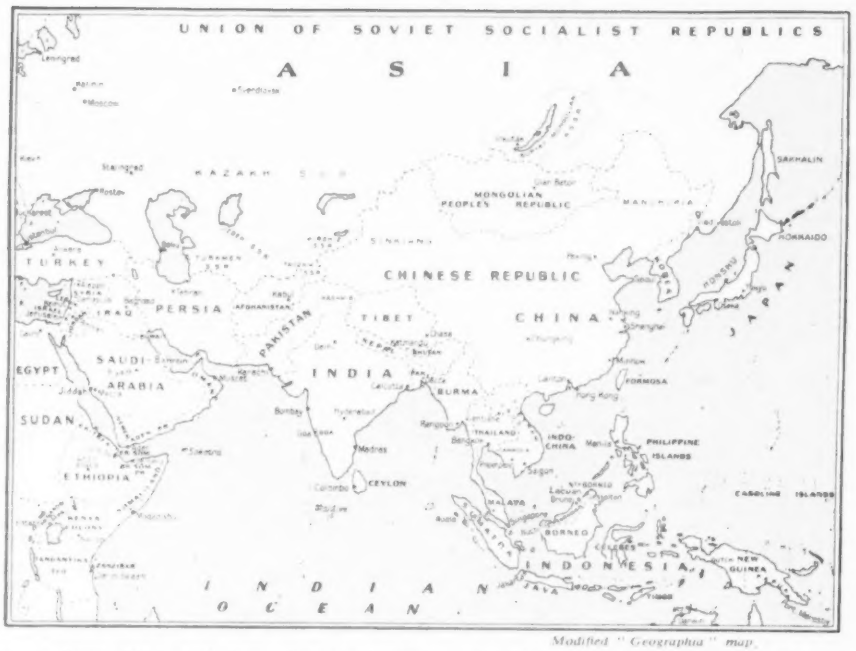
Director general, Henry Naccache; technical advisor, Victor Poirier.

Lebanese International Airways.—Abouchalach Building, Verdun Street, Beirut.

L.I.A. first operated with C-46s between Beirut and Kuwait. It is backed by Sabena and now operates to Dhahran, Teheran, Kuwait, Doha, Bahrain, Baghdad, Milan, Paris and Brussels.

The fleet consists of one DC-6 and two DC-4s.

President, A. Arida; general manager, Cmd. J. van Rooyen; admin. manager, J. C. Urbain; commercial manager, A. Eid.



Modified "Geographia" map.

Guide to the World's Airlines . . . .

Middle East Airlines Co., S.A.—Maktabi Building, Abdul Aziz Street, P.O.B. 206, Beirut.

M.E.A. was formed in 1945 as a private concern. After a period during which P.A.A. held 36 per cent. of the stock, B.O.A.C. has since held 48 per cent. It is now in the B.O.A.C. Associated Companies group. Services are flown to Athens, Geneva, Rome, London, Istanbul, Vienna, Frankfurt, Nicosia, Ankara, Cairo, Jerusalem, Aleppo, Damascus, Jedda, Aden, Baghdad, Teheran, Dhahran, Doha, Kuwait, Bahrain, Karachi and Bombay. All-freight services are flown to Athens, Rome, Milan, London, Baghdad, Teheran, Dhahran, Doha, Kuwait and Bahrain.

At mid-1959 the fleet consisted of seven Viscounts and four DC-3s.

Chairman and managing director, Sheikh Nasib Alamuddin; commercial director, Col. Cyril Essely; controller general, E. C. Terleske; general sales manager, Salim Salaam; general planning and economics manager, Asad Y. Nasr; general operations manager, Capt. Robert Hornall; general passengers service manager, Sami Musfy; treasurer, A. C. Middleton; personnel manager, Amin Saffoury.

MONGOLIA

UVS-MNR—Mongolian Airline.—The Airport, Ulan Bator, Mongolian People's Republic.

This, the Air Transport Administration of the Mongolian People's Republic, operates with Il-14s over the Ulan Bator-Irkutsk sector of the Moscow-Peking trunk routes.

NEPAL

Royal Nepal Airline Corporation, Ltd.—Khatmandu, Nepal.

With DC-3s this new carrier operates services in Nepal from Khatmandu to Simra, Biratnagar, Pokhra and Bhairawah.

PAKISTAN

Pakistan International Airline Corporation. — M.A. Khuro Road, Karachi.

P.I.A. was formed as a Government corporation in March, 1955, when it took over the operations and fleet of Orient Airways. Operations had been started by P.I.A. in June, 1954, with essential non-stop L-1049 services between Karachi and Dacca in the two wings of Pakistan. The Corporation now flies within West Pakistan and to Dacca and Chittagong in East Pakistan, and to points in India, Burma, Afghanistan, the Middle East, Italy, Switzerland and the U.K.

The fleet consists of three Vickers Viscount 815s, two L-1049Hs, three L-1049Cs, three Convair 240s and 10 DC-3s.

Chairman, Mirza Ahmed Ispahani; managing director, Air Cdre. M. Nur Khan; operations director, Gp. Capt. M. A. Dogar; admin. manager, M. M. Salim; commercial manager, J. S. Mirza; engineering manager, Enver Jamall.

PERSIA

Iranian Airways.—Avenue Saadi, Teheran.

Iranair was formed in December, 1944, and operates to all major centres in Iran, to the principal cities of the Middle East, to Afghanistan and Pakistan, and to Germany, Switzerland, Italy and Turkey.

The fleet at mid-1959 consisted of three Viscount 782s, three DC-4s, 14 DC-3s and one D.H. Dove.

Chairman and managing director, Reza Afshar; technical director, Sherwood A. Nichols; asst. managing director, Hooshang Afshar; controller, George J. Waas; director of traffic, Hooshang Talaodd; director of sales, John Maxwell; director of supply, John Northup; supt. of engineering, John Ferris.

Persian Air Services.—Ferdowsi Avenue 114, Teheran.

This company operates scheduled freight services to Beirut and to points in Europe. The fleet consists of Avro Yorks.

Managing director, A. Chafik.

PERSIAN GULF

Gulf Aviation Co., Ltd.—Speedbird House, Manama, Bahrain Island.

Gulf operates services from Bahrain and undertakes local charter work. The company was formed in January, 1950, and in October, 1951, B.O.A.C. took it over. It is one of the B.O.A.C. Associated Companies airlines.

The fleet consists of four D.H. Heron 4s, four D.H. Doves and one DC-3.

Chairman, G. Beeby Thompson; exec. director, E. H. W. Lewis; general manager, Capt. A. J. Bodger; chief engineer, P. Williams; accountant, T. Kikla.

Kuwait Airways.—P.O. Box 394, Kuwait.

Kuwait Airways, founded in 1953, operates services to Bahrain, Abadan, Basra, Jerusalem, Damascus, Cairo, Beirut, Dhahran, Doha, Karachi and Bombay.

The fleet consists of three Viscounts.

Chairman, Nisf Yusuf Al Nisf; vice-chairman, Abdul Aziz Al Saqer; chief executive, G. A. Boughton; manager, A. R. Mishri; commercial manager, S. M. Killingbeck; chief accountant, Y. Hindi.

PHILIPPINES

Philippine Air Lines, Inc.—M.R.S. Building, Plaza Cervantes, Manila.

P.A.L. was formed in 1932 as the Philippine Aerial Taxi Co. and was reorganized under its present name in 1941. Long-haul services were started between the Philippines and the U.S. in 1946. International operations were suspended in 1954, but plans for their resumption have since been approved and return to trans-Pacific routes with Douglas DC-8s is expected early in 1961. The company serves 70 points in its domestic system and operates regional flights between Manila and Hong Kong.

The fleet consists of two Vickers Viscount 784s, one Convair 340, 27 DC-3s and four D.H.C.-3 Otters. Expected this year are five Scottish Aviation Twin Pioneers, one Viscount 784 and two Fokker F-27s.

President, Col. Andres Soriano; first vice-president, A. Soriano, Jr.; vice-pres., director, Rafael Igoa; vice-pres., Daniel Mc. Gomez; vice-pres., operations, Capt. Renato Barretto; vice-pres., traffic and sales, Capt. Roberto Lim; vice-pres., engineering and maintenance, James Searl; vice-pres., treasurer, Ralph Schnabel; personnel manager, Leonardo M. Guinto.

PORTUGUESE INDIA

Transportes Aereos da India Portuguesa.—The Airport, Goa.

T.A.I.P. operates regional and long-haul services between Goa and Karachi, Beirut, Malta and Lisbon. The fleet in 1958 consisted of two Vikings, two D.H. Herons and one DC-4.

Director, Maj. A. G. Solano d'Almeida.

SAUDI ARABIA

Saudi Arabian Airlines.—P.O. Box 167, Jeddah.

Formed in 1946, this carrier is owned by the government and managed by T.W.A. Services are flown domestically and to Cairo, Beirut, Khartoum, Aden, Baghdad, Dhahran and intervening points. The fleet in 1958 consisted of 10 Convair 340s four DC-4s, 10 DC-3s and five Bristol 170s.

SINGAPORE

Malayan Airways, Ltd.—Airways House, Raffles Place (P.O. Box 397), Singapore 1.

Formed in 1937 by the Straits Steamship Co., the Ocean Steamship Co. and Imperial Airways, Malayan has, since 1947, operated services throughout Malaya, North Borneo, Brunei and Sarawak, and into Indonesia and Thailand. B.O.A.C. and Qantas (51%) and five governments—Singapore, the Federation of Malaya, and three Borneo territories (49%)—now provide the capital. In 1958 Malaya took over the operations of Federation Air Service with Beavers based in Kuala Lumpur. Services were extended to Hong Kong last year.

The fleet in mid-1959 consisted of 10 DC-3s, one DC-4 and three D.H.C. Beavers.

Managing director, J. A. Vick; general manager, J. W. Solly; secretary and chief accountant, A. A. Cooper; operations manager, Capt. J. R. Brown; engineering supt., S. H. Edwards; traffic manager, A. G. Boehm; sales manager, J. B. McKelvie.

SYRIA

Syrian Airways.—P.O. Box 417, Youssef Al-Azmeh Square, Damascus.

Formed in 1946, this company ceased operations in 1948, when Pan American withdrew its support. In 1951 the company restarted with government support and is operating services domestically and to the Lebanon, Egypt, Saudi Arabia, Iraq, Qatar and Kuwait.

The fleet consists of four DC-3s and three DC-4s.

Commercial manager, S. Imam.

THAILAND

Thai Airways Co., Ltd.—6 Larn Luang Road, Bangkok.

Formed in November, 1951, by the merger of Pacific Overseas Airlines (Siam) and Siamese Airways Co., Thai Airways is now being assisted by S.A.S. and a new company is to be formed. Services are flown domestically and to Rangoon, Calcutta, Penang, Vientiane and Saigon.

The fleet includes five DC-3s and three DC-4s.

The members of the board of directors include: chairman, Air Chief Marshal Chalermkiat Watanangura; vice-chairman, Air Marshal Perm Limpisvasti; adviser, Air Marshal Luang Prung Prichakas; acting managing director, Lt. Cdr. Prasong Suchiva; secretary, Tui Omas.

AUSTRALASIA

AUSTRALIA

Ansett/A.N.A.—289 William Street, Melbourne, Victoria.

In 1957, Ansett Transport Industries, which controlled Ansett Airways and the operations of the two companies were integrated. Ansett Airways started operations in 1936 with a service from Melbourne to Hamilton. Australian National Airways' history goes back to 1932 when operations were started by Holyman Brothers. The 15,558-mile network takes in 62 route points including all main centres. The fleet includes two Lockheed Electras, four Viscount 832s, two Viscount 747s, six Convair 440s, four DC-6Bs, one DC-6, two DC-4s (one freighter), 13 DC-3s (one freighter), three Bristol 170s, two Bristol Sycamores, one Djinn, two Bell 47Js, two Sandringham flying boats and one amphibian. Six F-27 Friendships are in process of delivery.

Directors: R. M. Ansett (chairman and managing), R. L. Cooper and R. R. Walker. General manager, J. A. West Lau; asst. general manager, G. S. Drury; commercial manager, F. Pascoe; finance manager and secretary, J. A. Ellis; operations manager, Capt. P. J. Gibbes; controller, E. J. B. Forrester.

Butler Air Transport Pty., Ltd.—Kingsford Smith Airport, Mascot, Sydney, N.S.W.

Established in 1934 and registered as a public company in 1952, Butler Air Transport operates services throughout N.S.W. and Queensland. It is now a wholly owned subsidiary of Ansett Transport Industries, Ltd.

The fleet consists of Convair 440s and DC-3s (see Ansett/A.N.A.).

Chairman, R. M. Ansett; general manager, S. C. Middlemiss; secretary, K. N. M. Hillyar.

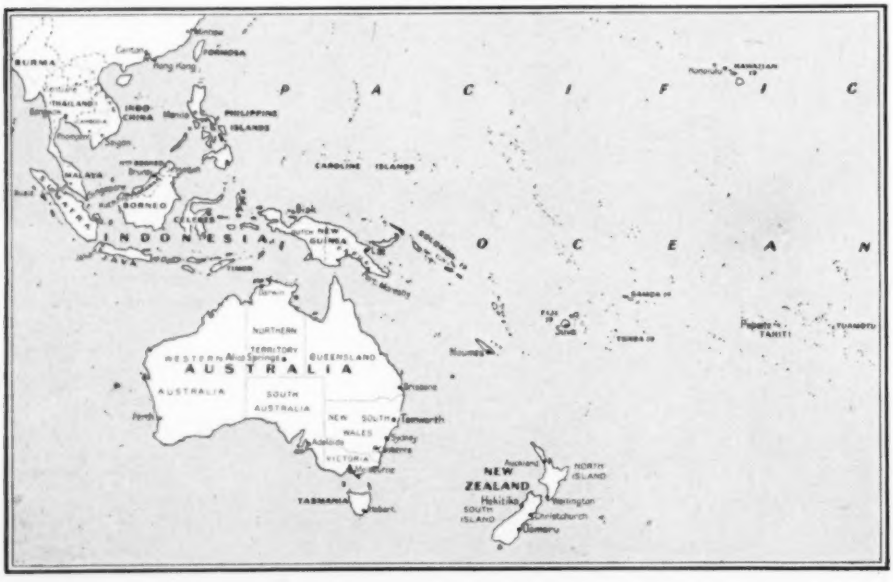
Connellan Airways, Ltd.—Townsite Aerodrome, Alice Springs (P.O. Box 1), Northern Territory.

Connellan was founded in 1938 and was wholly owned by E. J. Connellan until January, 1951, when it was taken over by a limited company. Connellan serves more than 90 stations through the Territory, calling also at points in Western Australia, Queensland and South Australia.

The fleet consists of two Beechcraft 18s, one Beechcraft 17, one D.H. Rapide, one Twin Bonanza B50 and three Cessna 180s.

Governing director, E. J. Connellan; manager, I. M. Leslie.

(*Continued on page 483*)



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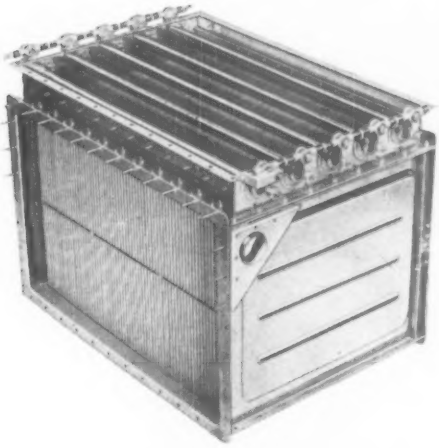

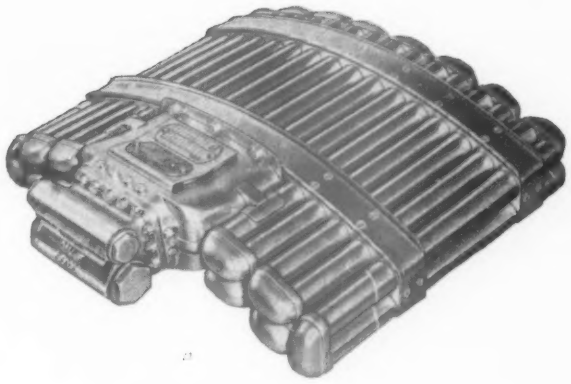

heat exchange

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Guide to the World's Airlines . . . .

(Continued from page 482)

East-West Airlines, Ltd.—P.O. Box 249, Tamworth, N.S.W.

Operating in New South Wales and Queensland, East-West Airlines was formed in 1947. Services link country and coastal centres of New South Wales and Southern Queensland with both Brisbane and Sydney. E.-W.A. took over South Coast Airways in 1953.

The fleet consists of four DC-3s and one F-27 Friendship. Two Lockheed Hudsons and one Beech D-50 are used on Government work.

Chairman, D. M. Shand; general manager, Capt. A. J. Smith; secretary and administration manager, R. O. Cooksey; operations manager, J. G. Riley; flight supt., Capt. R. W. Walesby; traffic supt., N. V. Buchanan; engineering manager, J. S. Bolton; commercial supt., A. H. Cook.

Gillham Airways Pty., Ltd.—7 Sydney Street, Mackay, Queensland.

Using Avro Ansons this new carrier operates over a 50-mile route between Mackay and Lindeman Island.

Guinea Airways, Ltd.—144 North Terrace, Adelaide, South Australia.

This company was, when established in 1927, concerned primarily with the movement of freight and personnel to and from the goldfields in New Guinea. In 1937 services were extended to the mainland through Adelaide and eventually through South Australia. Under a working agreement with T.A.A. in July, 1958, the two companies share staff and facilities. The fleet consists of five DC-3s.

Chairman, S. Powell; secretary, C. A. Window; chief pilot, Capt. N. S. D. Buckley.

Mac.Robertson Miller Airlines, Ltd.—194 St. George's Terrace, Perth, Western Australia.

Following a merger with Airlines (W.A.) in 1955, this company has operated throughout Western Australia and the Northern Territory. Mac.-Robertson Miller was formed in 1927 in South Australia, taking over the Commercial Aviation Co., which was founded by H. C. Miller in 1922, and transferred operations to Western Australia in 1934. Airlines (W.A.) was founded in 1935.

The aircraft fleet in 1958 consisted of five DC-3s and three D.H. Doves.

Managing director, Capt. C. N. Kleinig; executive director, J. W. Cameron; regional director, H. C. Miller; secretary, E. C. Gare.

Qantas Empire Airways, Ltd.—Qantas House, 70 Hunter Street, Sydney (P.O. Box 489), N.S.W.

The original Queensland and Northern Territory Aerial Services was formed in November, 1920, and the first scheduled service was flown in November, 1922, between Charleville and Cloncurry. In 1931 Qantas joined Imperial Airways in carrying the first experimental mails between Australia and England. Q.E.A. was incorporated in January, 1934, and in 1947 became the Commonwealth Government's instrument for the operation of all Australia's international services and the shareholdings were purchased by the Government. The operation of its internal services was transferred to T.A.A. in April, 1949, and B.C.P.A.'s operations were taken over in April, 1954.

Qantas operates the World's first round-the-World turbojet service from Sydney, through the U.S. to London, Europe, and the Middle East, and back to Sydney. It operates services to San Francisco, Vancouver, Tokyo, Hong Kong, Johannesburg, Noumea, Norfolk Island and New Guinea, where it has a self-contained unit.

The fleet in September, 1959, consisted of seven Boeing 707-138s, 16 L-1049s, five DC-4s, eight DC-3s, four D.H.C. Otters and one D.H.A. Drover. On order were four Lockheed Electras.

Chairman, Sir Hudson Fysh, K.B.E., D.F.C.; vice-chairman, W. C. Taylor; chief executive and general manager, Cedric O. Turner, C.B.E.; dep. chief executive and general manager, G. U. Allen, C.B.E., A.F.C.; director of technical services, R. J. Ritchie; director of commercial services, C. W. Neilson; secretary to the board and director of finance, F. C. Derham.

Queensland Airlines Pty., Ltd.—Brisbane Airport, Brisbane, Queensland.

Founded by Capt. R. S. Adair in 1927 as Aircrafts Pty., Ltd., this is the oldest Australian inter-state airline. Its present name was adopted in 1947 and it is now associated with Ansett Transport Industries. A network of services is operated within Queensland and to New South Wales.

The fleet consists of Convair 440s and DC-3s (see Ansett-A.N.A.). Two F-27s are on order.

Chairman, R. M. Ansett; managing director, Capt. R. S. Adair, O.B.E.

Trans-Australia Airlines.—339 Swanston Street, Melbourne, C.1, Victoria.

This is a Government-sponsored operator, controlled by the Australian National Airlines Commission, which was established in 1946 to fly domestic services. T.A.A. operates over 29,647 route miles, the largest domestic network in the Commonwealth, serving centres throughout Australia.

The fleet (September) consisted of two Lockheed Electras, 15 Viscounts (720, 756 and 816), seven F-27 Friendships, two Convair 240s, three DC-4s, 16 DC-3s (four freighters) and three Hillers. Five F-27s were on order.

Chairman, W. D. McDonald, C.B.E.; general manager, John P. Ryland, D.F.C.; asst. general manager, Capt. J. Chapman, O.B.E.; director of engineering, J. L. Watkins; director of operations, R. E. Bailey, D.S.O., D.F.C.; director of finance, R. E. Edelston-Pope; commercial director, L. L. McKenzie.

Woods Airways Pty., Ltd.—National House, 49 William Street, Perth, W. Australia.

Woods Airways operates over the 25-mile Perth-Rottnest Island route. The company was incorporated in December, 1947, and operations started in March, 1948. The fleet consists of two Avro Ansons.

Managing director, Capt. James Woods.

FIJI

Fiji Airways, Ltd.—Victoria Arcade, Suva.

Fiji Airways flies over a 551-mile local network, including a service connecting Suva with Nandi, the international airport. Non-scheduled flights are made to other Pacific groups. Services were started in September, 1951. The company was purchased by Qantas in March, 1958.

The fleet consists of two D.H. Herons and two D.H.A. Drovers.

Manager, C. D. Ritchie; chief pilot, P. K. Frame; chief engineer, K. P. Beohm; secretary, R. L. Kay.

FRENCH OCEANIA

Reseau Aérienne Interinsulaire.—Messageries Maritimes (P.O. Box 96), Papeete, Tahiti.

R.A.I. flies local services in the Society Islands, and started operations in 1951. It is managed by the Service of Public Works and Mines. The fleet consists of two Catalinas and a Short Bermuda.

Manager, R. Yvernat.

NEW CALEDONIA

Transpac (Société Caledonienne de Transports Aériens).—6 Rue de Verdon, Noumea.

Transpac was founded in May, 1955, and started services in September. Services to the Loyalty Islands and Ile des Pines are now subsidized by the Territory. Shares in the company are privately owned. The fleet consists of D.H. Herons and Rapides.

President, H. G. Martinet; manager, H. C. Coursin; tech. manager, J. A. Lafargue; chief engineer, A. Couilland.

NEW GUINEA

De Kroonduif, Ltd.—1 Plesmanweg, The Hague, Holland.

This company operates local services from Biak. The fleet consists of three DC-3s (chartered from K.L.M.), four D.H.C. Beavers and two Twin Pioneers.

It is managed by K.L.M.

Gibbes Sepik Airways, Ltd.—Goroka.

Gibsepair flies internal scheduled and unscheduled services from Wewak, Goroka and Madang. The fleet consists of six Norseman and three Ju.52s.

Managing director, J. B. Sedgers; manager, A. M. Anthony; secretary, V. W. Cox; chief engineer, F. G. Newell.

Mandated Airlines, Ltd.—P.O. Box 25, Lae.

M.A.L. operates local services from Lae to Madang, Wewak, Manus Island, Kavieng, Rabaul, Goroka, Wau and Port Moresby. It was founded in 1936. The fleet consists of five DC-3s.

Managing director, J. B. Sedgers; manager, V. Nagle; secretary, B. Hay.

NEW ZEALAND

New Zealand National Airways Corporation.—P.O. Box 96, Wellington, C.1.

Founded in 1945 with Government capital, N.Z.N.A.C. operates the majority of the Dominion's air services.

The fleet consists of 26 DC-3s, one D.H. Heron, three Viscount 807s and two D.H. 89s.

Chairman, Air Vice-Marshal Sir Leonard Isitt, K.B.E.; general manager, J. J. Bush, O.B.E.; asst. general manager, D. E. Foley; asst. to general manager, D. A. Patterson, M.B.E.; operations manager, P. A. Matheson, O.B.E.; supt. of technical development, H. C. Walker, M.V.O., A.F.C.; engineering supt., C. W. Labette; commercial manager, W. J. Jennings.

Tasman Empire Airways, Ltd.—P.O. Box 2201, Auckland.

TEAL was formed in 1940 under the joint ownership of New Zealand, Australia and the U.K., to operate services between Australia and New Zealand. It is now a 50-50 partnership between Australia and New Zealand. It operates to Australia and Fiji (DC-6s), to Norfolk Island (Qantas DC-4) and from Fiji (Solent) to Samoa, the Cook Islands and Tahiti.

The fleet at mid-1959 consisted of three DC-6s and one Solent 4. Three Electras are on order.

Chairman, Air Vice-Marshal Sir Leonard Isitt, K.B.E.; general manager, F. A. Reeves; asst. general manager and deputy chief executive, J. W. Veale; operations manager, K. A. Brown-ohn; accountant, A. A. Watson, D.F.C.

West Coast Airways, Ltd.—Seaview Airport (P.O. Box 106), Hokitika, Westland.

West Coast took over its scheduled services between Hokitika, Haast and Milford Sound from N.Z.N.A.C. in November, 1956. Two D.H. Rapides are used.

Managing director, F. J. Lucas; directors, B. Topliss and J. R. Kilian.

EUROPE

AUSTRIA

Austrian Airlines (Osterreichische Luftverkehrs Aktiengesellschaft).—Operating 13, Vienna I.

Founded in September, 1957, Austrian Airlines started operations on March 31, 1958, and now serves points in Europe including London, Brussels, Amsterdam, Frankfurt, Paris, Zurich, Rome, Warsaw, Moscow, Belgrade, Sofia and Bucharest. The shareholders are the Scandinavian Airlines System, Fred Olsens Flyselskap, banks and publicly owned undertakings in Austria.

The fleet consists of four Viscount 779Ds chartered from Fred Olsens Flyselskap.

General managers, Capt. Sepp Froeschl and Dipl. Ing. Rudolf Trimmel.

AZORES

Sociedade Acoriana de Transportes Aereos, Lda.—Praca da Republica 9 and 13, Ponta Delgada, Sao Miguel.

Formed in February, 1947, this company is largely owned by Bensaude and Co. Using D.H. Doves, local services are flown to Santa Maria and Terceira.

General manager, A. M. S. Noqueira.

BELGIUM

Sabena (Société Anonyme Belge d'Exploitation de la Navigation Aérienne).—Air Terminus, Brussels.

Sabena started operations in 1924. It is a commercial undertaking managed by a board of 14 directors, seven of which are elected by the Belgian State and the Belgian Congo. In Europe, Sabena serves 20 countries.

Modified "Geographia" map.

Intercontinental services are flown to New York, Tel Aviv, Beirut, Cairo, Casablanca, Johannesburg and the Congo. The company's operations in Africa form the largest colonial network in the World. For seven years Sabena has also been operating an

Guide to the World's Airlines . . . .

international city-centre helicopter network.

At mid-1959, the aircraft fleet consisted of 28 DC-3s, 11 Convair Metropolitans, eight DC-4s, two DC-6s, three DC-6As, eight DC-6Bs, nine DC-7Cs, eight Sikorsky S-58s, one Bell 47H1 and one Alouette. Five Boeing 707-320s are on order.

Chairman, Gilbert Périer; managing director, Gaston Claeys; general manager, Willem Deswarte; asst. general manager, Gaston Dieu; senior vice-pres., technical, Félicien Pirson; senior vice-pres., Anselme Vernieuwe; vice-pres., sales, Valentin Pacco; vice-pres., operations, Marc Stainier; secretary-general, Roger Nys; technical adviser, Fernand De Ridder; vice-pres., Africa, Jean Annez de Taboada.

BULGARIA

TABSO (Bulgarian Civil Air Transport).—12 Place Narodno Sobranie, Sofia, C.

Services are flown by TABSO domestically, and to Belgrade, Vienna, Warsaw, Berlin, Bucharest, Kiev, Moscow and Budapest. The fleet consists of Li-2s and Il-14s.

CYPRUS

Cyprus Airways, Ltd.—16 Byron Avenue, Nicosia.

The company was formed in 1947 and the Government of Cyprus is the major shareholder, with B.E.A. holding 23% of the shares. Under an arrangement made with B.E.A., in early 1958, B.E.A. Viscounts now operate, on a charter basis, on all sectors previously flown by DC-3s of Cyprus Airways.

Chairman, Dr. C. Raeburn, C.B.E.; general manager, Gp. Capt. P. Holroyd Smith, O.B.E.; asst. gen. manager, J. Theodossiou.

CZECHOSLOVAKIA

Ceskoslovenske Aerolinie.—Namesti Republiky 655/8, Prague, 1.

Services were restarted by Czechoslovak State Airlines in 1945, the company being nationalized in 1949. CSA flies domestically and to Cairo and Bombay, Belgrade, Bucharest, Berlin, Copenhagen, Stockholm, Helsinki, Moscow, Vienna, Paris, London, Budapest, Sofia and Warsaw.

The fleet in 1958 consisted of three Tu-104As, six DC-3s, six Il-12s and 25 Il-14s.

Director general, Josef Procházka; director of operations, Alois Palichleb; technical director, Ing. O. Holovsky; commercial director, Jan Barcal.

FINLAND

Finnair (Aero O/Y).—4 Töölönkatu (P.O. Box 278), Helsinki.

Aero O/Y was founded in 1923 and started its first services in 1924 using floatplanes. When airports in Turku and Helsinki were built, the company was able to operate regularly all the year round. In 1947, nine DC-3s were bought and the company extended its services, via Stockholm and Copenhagen, to Amsterdam, Hamburg and Dusseldorf. By 1953 the company had bought Convair 340s and started to fly to Paris and London. Finnair now also flies to Sundsvall, Cologne, Frankfurt, Geneva and Moscow.

At mid-1959 the fleet consisted of 10 DC-3s and six Convair 440s.

President, General Leon Grandell; vice-pres., technical, B. Aulin; vice-pres., traffic and sales, M. Manninio; vice-pres., operations, K. Temmes.

Karhumaki Airways (Kar-Air O/Y).—Lonnrotinkatu 3, Helsinki.

This company is an independent carrier, operating domestic routes in Finland and an international route to Stockholm. Scheduled domestic service was introduced in 1950 using Rapides and, later, Lodestars.

The fleet now consists of two Convair 440s, three DC-3s and one Lodestar.

Chairman of the board, Niilo Karhumaki; president, Uuno Karhumaki; traffic manager, Lars Collianders; technical director, Tuomas Karhumaki.

FRANCE

Air France.—2 Rue Marbeuf, Paris, 8e.

France's national airline evolved from private ventures in the early 1920s. By 1933 liquidation and amalgamation had reduced these companies to one—Air France, with Air Bleu, formed in 1935, to look after postal services and, in 1937, Air France Transatlantique to fly to America. In 1948, the three companies were absorbed into the Compagnie Nationale Air France, a limited liability company with an independent identity. Provision was made for the retrocession of 30% of the stock to communities, public organizations and individuals. In 1953 Air France was empowered to acquire interests in other overseas French air transport concerns.

At present, Air France holds shares in the following companies: Royal Air Maroc, Air Transport, Tunis Air, Air Inter, Air Liban, Air Vietnam, Air Laos, Royal Air Cambodge, Relais Aériens, SITA. Air France operates the longest network in the world (193,000 miles); overseas services are flown to North, Central, West and East Africa and Mauritius, to the Middle East, India, Vietnam, Hong Kong, Manila, Japan (Polar flights), and to North, Central and South America. Apart from its European services it also operates over a metropolitan network.

At mid-1959, the fleet consisted of 10 L-1649s, 22 L-1049s, 15 L-749s, 23 DC-4s, 11 Viscounts, 35 DC-3s, 12 Breguet Deux Ponts and five Caravelles. On order are 17 Boeing 707-320s and 19 Caravelles.

President, Max Hymans; general manager, Louis Lesieux; deputy general managers, Maurice Lemoine (secretary-general), Robert Montarnal (economics and finance) and Raymond Dupré (technical); traffic and sales manager, Michel Henry de Villeneuve; operations manager, Pierre Marion.

Cie Air Transport.—9 Boulevard Malesherbes, Paris 8e.

In conjunction with Silver City (see under United Kingdom), this company participates in the rail-air-rail services between London and Paris.

Cie de Transports Aériens Intercontinentaux.—23 Rue de la Paix, Paris 2e.

An entirely private company, T.A.I. was founded in July, 1946. It is now a regular long-range carrier. Scheduled services are flown to Morocco, French West Africa, Somaliland, Madagascar, Greece, Egypt, Pakistan, Indo-China, Indonesia, Australia, New Caledonia, New Zealand, New Hebrides, Wallis and Fiji Islands, Tahiti, Honolulu and Los Angeles.

The fleet consists of three DC-7Cs, five DC-6Bs, two DC-4s, and three DC-3s. Two DC-8s are on order.

President, Paul Bernard; vice-president, General Fayet; director-general, J. J. Wilmot-Roussel; technical director, P. Wiker; commercial director, A. Gaffie; sales manager, F. Serraz.

Union Aéromaritime de Transport.—5 Boulevard Malesherbes, Paris 8e.

This company was founded in November, 1949, and operates services Paris-Nice and to North, West Central and South Africa. U.A.T. also flies local connecting services in West and Central Africa.

The fleet in 1958 consisted of 10 DC-6s, seven D.H. Herons, three DC-4s and seven Nord 2502s. On order are two DC-8s.

Chairman and managing director, Louis Pommery; directors, Jean Combard and Roger Loubry; asst. directors, A. Veillard and J. P. Villaceque.

GERMANY (EAST)

Deutsche Lufthansa.—Franzosische Strasse, 53-56 Berlin, W.8, German Democratic Republic.

The East German D.L.H., flying under the same name and symbol as the West German Lufthansa, has been operating since February, 1956. Services are flown domestically. Interflug now operates international services to Moscow, Vilno, Warsaw, Prague, Budapest and Sofia.

The fleet consists of German-built Il-18s.

General director, Arthur Pieck; traffic director, Fritz Horn; technical director, Ernst Wendt.

GERMANY (WEST)

Deutsche Lufthansa Aktiengesellschaft.—1 Claudiusstrasse, Cologne.

Lufthansa started its post-war operations with domestic flights within Germany on April 1, 1955, and to European centres on May 15, 1955. Transatlantic services were started on June 1, 1955. Services to South America and the Middle East started in 1956.

The fleet consists of nine Convair 440s, seven L-1049Gs, four L-1649As, nine Viscount 814s and three DC-3s. On order are four Boeing 707s-420s.

Chairman, Dr. Kurt Weigelt; managing director, Hans M. Bonners; technical director, Gerhard Holtie.

GIBRALTAR

Gibraltar Airways, Ltd.—Cloister Building, Market Lane.

Gibraltar Airways was formed in May, 1947. B.E.A. holds a 51% interest, the other 49% being held by M. H. Bland and Co., Ltd., a Gibraltar shipping company. Services to Tangier are operated by B.E.A.

Chairman, Sir George Gaggero, O.B.E., J.P.

GREECE

Olympic Airways S.A.—6 Othonos Street, Athens.

Formed in January, 1957, Olympic Airways is the successor to T.A.E., National Greek Airlines, which was formed in July, 1951, by an amalgamation including Hellenic Airlines. Olympic operates over a domestic network and to London, Paris, Rome, Frankfurt, Zürich, Brindisi, Istanbul, Nicosia, Beirut, Tel Aviv, Cairo and Alexandria.

The fleet consists of three DC-6Bs, two DC-4s and 14 DC-3s. On order are two D.H. Comet 4Bs and two DC-8s.

General manager, Sp. Damaskinos; system sales manager, J. Papadakis; traffic manager, Ch. Mavrokefalos; technical manager, C. Danis; admin. manager, D. Koundouris; financial manager, M. Brahalis; operations manager, C. Hondros.

HUNGARY

Malév (Magyar Légiközlekedési Vállalat).—Vörosmarty Ter 5, Budapest V.

Malév was founded in March, 1946, and started operations in October, 1946, as Magyar Szovjet Polgári Légiközlekedési R.T. (Hungarian Soviet Civil Air Traffic Co.), with Hungarian and Soviet capital. In 1954 Maszovjet was converted into a purely Hungarian State-owned company and the present title was adopted. Scheduled services are flown to Amsterdam, Belgrade, Berlin, Brussels, Bucharest, Copenhagen, Prague, Sofia, Tirana, Warsaw, Vienna, Moscow, Kiev, Stockholm, and Zürich.

The fleet consists of Li-2s and Il-14s.

General manager, Alexander Huvös; asst. general manager-chief engineer, George Lénárt; commercial manager, Vladimir Zamek; manager, travel and freight dept., Béla Németh; chief accountant, Kálman Kertai.

ICELAND

Icelandair (Flugfelog Islands H.F.).—Reykjavik Airport, P.O. Box 955, Reykjavik.

Founded in June, 1937, Icelandair operates services to 21 centres in Iceland and from Reykjavik to Glasgow, London, Hamburg, Oslo and Copenhagen.

The fleet consists of two Viscounts, three DC-3s, one DC-4 and two Cansos.

Chairman, G. Vilhjalmsson; general manager, Orn O. Johnson; chief pilot, J. R. Snorrason; chief engineer, B. Tomsson; secretary, S. K. Matthiasson; traffic manager (overseas), Birsir Thorhallsson; traffic manager (internal), Hilmar Sigurdsson; public relations manager, N. Simonarson; chief accountant, S. Thorbjornsson.

Icelandic Airlines (Loftleidir H.F.).—Lækjargata 2, P.O. Box 476, Reykjavik.

This company flew domestic services from 1944 until February, 1952. International services were started in June, 1947, with a DC-4, to Copenhagen. Since 1948, scheduled services have been flown between Europe and America, via Iceland, calling at Amsterdam, Luxembourg, Hamburg, Copenhagen, Gothenburg, Oslo, Stavanger, Bergen, London, Glasgow, Reykjavik and New York.

The present fleet consists of four DC-4s; it is planned to purchase DC-6Bs.

Chairman, K. Gudlaugsson; general manager, A. Eliasson; manager, traffic and sales, M. Petersen; technical manager, H. Sigurjónsson; operations manager, E. K. Olsen; advertising manager, S. Magnússon.

IRELAND

Aer Lingus Teoranta.—43 Upper O'Connell Street, Dublin.

Aer Lingus has been operating since 1936. The issued share capital is now held by Aer Rianta, the Government-owned holding company (95.4%) and B.E.A. (4.6%). Services are operated from Dublin to London, to provincial and holiday centres in the U.K., to Amsterdam, Brussels, Copenhagen, Dusseldorf, Frankfurt, Paris, Rome and Zürich. Seasonal services link Dublin with Lourdes, Lisbon and Barcelona. Many of the company's services to the Continent operate through Manchester.

The fleet at mid-1959 consisted of six Viscount 808s, four Viscount 707s,

(*Continued on page* 485)

Two of Aer Lingus's Fokker F-27 Friendships at Collinstown Airport, Dublin, with the terminal building in the background.

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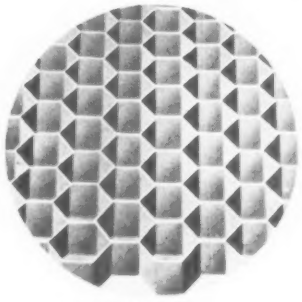

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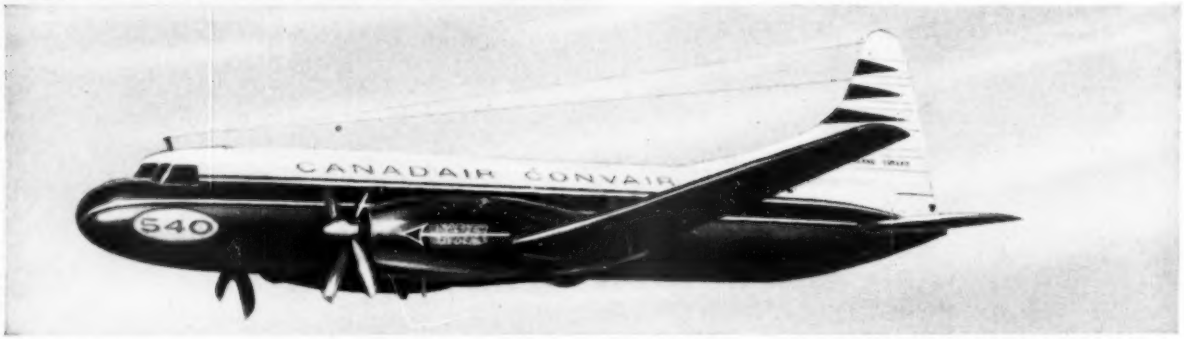
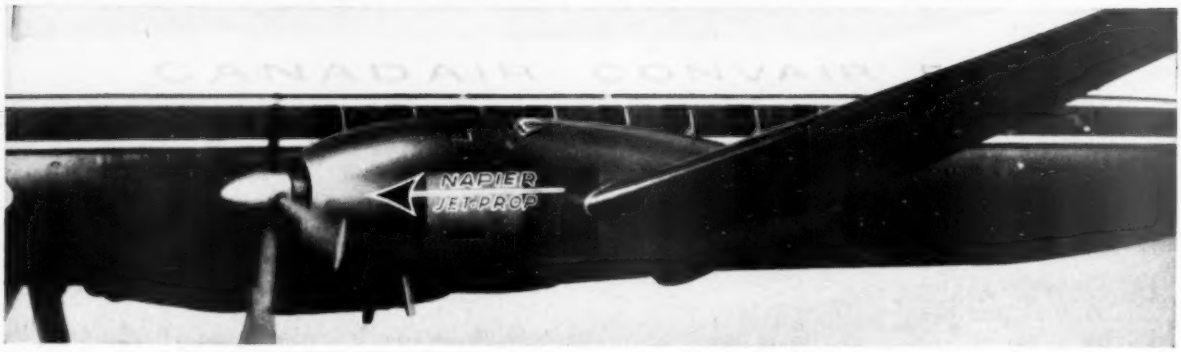
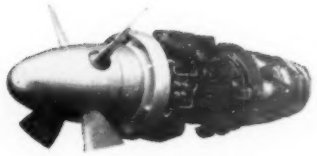


LOOKS FORWARD 10 AIRLINE YEARS



WITH ELAND JET-PROPS



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The Eland-engined Canadair 540, latest version of the world-famous Convair, offers airline operators an aircraft that will meet their requirements and growth for at least the next ten years. It ensures them a better payload, a faster block speed and lower operating cost, combined with high performance, strong passenger appeal and ease and economy of maintenance.

NAPIER ELAND JET-PROPS

D. NAPIER & SON LIMITED, LONDON, W.3. A MEMBER OF THE ENGLISH ELECTRIC AVIATION GROUP

Guide to the World's Airlines . . . .

(*Continued from page 484*)

seven F-27 Friendships and five DC-3s.

Chairman, P. Lynch; general manager, J. F. Dempsey; deputy general manager, Capt. J. C. Kelly-Rogers. Assistant general managers: secretary, James Gorman; technical, Capt. W. Scott; commercial, P. J. Brennan; administration, M. J. Dargan. Traffic manager, O. Hone; sales manager, J. R. Leonard; publicity manager, T. P. Byrne; chief engineer, Capt. P. McCormack; operations manager and chief pilot, Capt. S. Williamson.

Aerlinte Eireann Teoranta.—43 Upper O'Connell Street, Dublin.

Aerlinte Eireann, a sister company of Aer Lingus, was incorporated in 1947 to operate between Ireland and the U.S.A. The original plans were shelved, but the project was reactivated in 1958 when the company opened a transatlantic service from Dublin, via Shannon, to New York. The service has now been extended to Boston. At present all the shares are held by Aer Rianta.

Three L-1049H Super Constellations leased from Seaboard and Western Airlines are used. Three Boeing 707-048 jet airliners are on order for delivery in late 1960.

Chairman, J. Leydon; general manager, J. F. Dempsey; deputy general manager, Capt. J. C. Kelly-Rogers; asst. general manager and secretary, James Gorman; asst. general manager (commercial), P. J. Brennan; sales manager (New York), Brendan O'Kelly; district manager (Boston), J. F. O'Dowd.

ITALY

Alisud—Cia Aerea Meridionale.—Calata San Marco 13, Naples.

Operates between Salerno and Ischia. No other information.

Alitalia—Linee Aeree Italiane.—Viale Maresiallo Pilsudski 92, Rome.

Alitalia operates all the domestic services in Italy and long-haul services to North and South America, North, Central, East and South Africa, the Middle East, Pakistan and India, Austria, Belgium, France, Germany, Greece, Portugal, Spain, Switzerland and the U.K. B.E.A. holds 6.75% of the shares.

The fleet consists of six DC-7Cs, eight DC-6Bs and three DC-6s, six Convair 440s, 10 Viscounts and 12 DC-3s. On order are four DC-8s (Conway 50?) and four Caravelle IIIs.

Chairman, Count Dr. Nicolò Carandini; vice-chairman, Lord Douglas of Kirtleside and Gen. S. A. Aldo Urbani; general manager, Dr. Ing. Bruno Velani; vice-gen. manager, Dr. Donato Saracino; commercial manager, Renato Cannellett.

Cia Italiana Elicotteri, S.R.L.—Via Lima 42, Rome.

This company operates helicopter services between Rimini and Monte Titano, San Marino. It was constituted in November, 1956, does agricultural, charter and photographic work and runs flying schools at Rome (Urbe) and Milan (Linate). The fleet consists of four Bell 47s.

Managing director, Dr. Gianfranco Chiarato; technical director and chief pilot, Com. Mario Pennacchi.

Elivie Italiane Co.—Alisud, 13 Calata S. Marco, Naples.

Another helicopter operator, E.I.C. uses Bell Rangers on summer services between Naples, Capri and Ischia, connecting at Naples with the Alitalia services.

Societa Di Navigazione Aerea.—Urbe Airport, Via Salaria, Rome.

Operates a daily summer schedule with D.H. Doves between Rome and Pescaria.

JUGOSLAVIA

Jugoslovenski Aerotransport.—Bircaninova 1, Belgrade, 3.

J.A.T. was formed in 1947, as a Government-owned company, to take over all Jugoslavia's air transportation. Since then it has carried all the country's air traffic, domestic and international. In 1958 the fleet consisted of 13 DC-3s, two Convair 440s, one Convair 340 and six Il-14s.

Director-general, Col. M. Simovic; traffic and operations director, V. Rakic; commercial director, A. Badaniak.

MALTA

Malta Airways Co., Ltd.—60 South Street, Valetta.

This is an associate company of B.E.A., which operates services on its behalf on routes jointly licensed to the Corporation and Malta Airlines. Capital is held by Maltese shareholders and by B.E.A. (34%).

NETHERLANDS

K.L.M. Royal Dutch Airlines (Koninklijke Luchtvaart Maatschappij N.V.).—Piesmanweg 1, The Hague.

K.L.M. was founded in 1919 by banking and commercial enterprises. Of the airlines now operating K.L.M. was the first to inaugurate a scheduled service — between Amsterdam and London—in May, 1920. In 1929 a regular service from Amsterdam to the Far East was opened, followed in 1935 by services in the Caribbean. In 1946 K.L.M. inaugurated services to North and Central America, in 1947 to South Africa and South America and in 1951 to Australia. Of the issued and fully paid-up capital at April, 1959, about 70% is held by the Netherlands Government.

At mid-1959 the fleet consisted of one Convair 240, 12 Convair 340s, 13 DC-3s, six DC-6s, seven DC-6A/Bs, 15 DC-7Cs, 10 Lockheed L-749As, 18 L-1049 E/G Hs and nine Vickers Viscount 803s. On order were two Fokker F-27s, 12 DC-8s and 12 Lockheed Electras.

President, I. A. Aler. Exec. vice-presidents, F. Besançon, L. H. Slotemaker and J. van der Wiel.

NORWAY

Braathens South-American and Far East Airtransport A.S.—Fr. Nansens plass 7, Oslo.

Formed in March, 1946, Braathens S.A.F.E. made its first Far East flight with a DC-4 early in 1947. In 1949 rights were obtained to fly scheduled services to Hong Kong, but these were withdrawn in March, 1954, and, internationally, only non-scheduled flights are now being made. S.A.F.E. operates a number of domestic services.

The fleet includes two DC-4s, two DC-3s and two D.H. Herons and two F-27 Friendships.

Chairman and president, Ludvig G. Braathen; vice-pres., Björn G. Braathen; operations manager, J. Rad; commercial manager, E. Frøysaa.

Widerøe's Flyveselskap og Polarfly A.S.—Kr. Augustsgt 19, Oslo.

This company was formed in 1934. Apart from charter, ambulance and other work, scheduled services are flown from Narvik and from Tromsø.

In 1958 the fleet included four D.H. Otters, five Norseman and two Lockheed 12s.

General manager, Viggo Widerøe.

POLAND

Polskie Linie Lotnicze, LOT.—Grojecke 17, Warsaw.

Government-owned, LOT'S history goes back to 1929. Domestic services and international services are operated to Berlin, Brussels, London, Paris, Vienna, Copenhagen, Moscow, Athens, Amsterdam, Zurich, Prague, Budapest, Bucharest, Belgrade, Tirana and Vilno.

The fleet includes four Convair 240s, 12 Avia Il-14s and 30 Li-2s for domestic services.

Director-general, Jan Krywicki. Managers: technical, F. Ing. R. Kurylanski; commercial, A. Wojnowski; operations, M. Garbowski.

PORTUGAL

Transportes Aereos Portugueses, S.A.R.L.—2 Rua B aamcamp, Lisbon.

This State-owned airline was formed in 1946 and reorganized in 1953. It operates services to Luanda (Angola), Lourenço Marques (Mozambique) and, within Europe, to London, Paris, Brussels and Madrid. The fleet consists of three L-1049Gs and three DC-4s.

Chairman, Eng. Alfredo Vaz Pinto; secretary general, Eng. Eurardo Mendes Barbosa; commercial director, Jorge de Abreu.

RUMANIA

Tarom (Transporturi Aeriene Romine).—Baneasa Airport, Bucharest.

Tarom, the State airline which succeeded the Soviet - Rumanian TARS in 1954, operates services to Budapest, Prague, Berlin, Copenhagen, Brussels, Belgrade, Moscow, Kiev, Sofia, Athens and Vienna, and domestically.

The fleet consists of Li-2s, Il-12s and Il-14s.

General manager, V. Cosma; commercial manager, C. Nenoiu; technical manager, N. Vidvischi.

One of LOT's Il-14s on the apron at Warsaw's Okecié Airport.

SCANDINAVIA

Scandinavian Airlines System.—Bromma Airport, Bromma 10, Stockholm.

S.A.S. was formed in 1946 by D.D.L. (Denmark), D.N.L. (Norway) and A.B.A. (Sweden) to operate transatlantic services. In 1948 its scope was extended to all international operations and in 1951 the three national airlines became partners in a reorganized S.A.S. which was financed 50% by State and 50% by private capital. Apart from an extensive European network, S.A.S. operates to Montreal and New York, to Winnipeg and Los Angeles via Greenland, to Brazil, Uruguay, Argentina and Chile, to the Middle East, India, the Far East and Japan, to Tokyo via Alaska, and to South Africa. S.A.S. has an engineering and equipment agreement with Swissair.

The fleet consists of 14 DC-7Cs, 13 DC-6Bs, 12 DC-6s, 20 Convair 440s and six Caravelles. Eleven more Caravelles, two Convair 600s and seven DC-8s are on order; two Convair 600s will be leased from Swissair.

President, A. Rusck; exec. vice-presidents: V. J. Rasmussen, N. Langhelle and Th. A. Boye. Vice-presidents: foreign affairs, P. Beck-Nielsen; economics, H. Bernstrom; operation, engineering and maintenance, O. Carlstein; asst. to president, P. O. Edén; engineering and research, K. Hagrup; passenger flight service, F. Hildestrand; personnel, S.-E. Svanberg; operations, B. Tornblom. General manager, sales, K. A. Kristiansen; general manager, traffic, H. Jaffe.

SPAIN

Aviaco (Aviacion y Comercio, S.A.) Aduana 33, Madrid.

Founded in March, 1948, Aviaco flies schedules within Spain and to North Africa, France and Portugal. At mid-1959 the fleet consisted of five D.H. Heron 2s, three Bristol 170s, five Languedocs and three Convair 440s.

Vice-president, José Rubio López; managing director, Emilio Gil Cacho; administration manager, José Inchausti Balseiro; operations manager, Juan Carbo Amiguet; commercial manager, Jesús Ramos González; chief engineer, Luis Valenzuela Cervera.

Iberia (Lineas Aereas de España).—Avenida de América, 2, Madrid.

The predecessor company of Iberia was formed in 1938. In June, 1940, it was incorporated with 51% Government capital. In 1944 the Government became the sole holder of stock, apart from up to 25% which could be held by Spanish shipping. Iberia flies an internal network and internationally to points in Europe, to North and West Africa, to South and Central America, and to New York.

The fleet consists of five L-1049E/Gs, seven Convair 440s, 21 DC-3/4s and four Bristol 170s. Three DC-8s are on order.

President, Tomas Delgado; general manager, Cesar Gómez Lucia; operations manager, J. M. Ansaldo; secretary-general, Juan B. Viniegra.

SWEDEN

Linjeflyg A.B.—Bromma Airport, Bromma 10, Stockholm.

This company was formed in April, 1957, to operate domestic services. It succeeded Airtaco, which had been operating a service, primarily for newspaper delivery, since 1950. By 1955, control of the company had been obtained by *Dagens Nyheter*, which has retained a 33½% interest. *Stockholms Tidninger* holds 8½%, A.B. Svenska Pressbyran 8½% and S.A.S. 50% of the capital.

The fleet at mid-1959 consisted of 11 DC-3s and two Lodestars.

Chairman, Ake Rusck; president, Sven Ostling; asst. to president, Bo Nilsson; technical and operations manager, Ake Weimar; manager, traffic and sales, Sten Sandberg; manager, flight operations, Torvald Andersson; commercial manager, C. O. Munkberg.

SWITZERLAND

Swissair (Swiss Air Transport Co., Ltd.).—P.O. Box 929, Zurich 1.

In March, 1931, Ad Astra Aero (founded in 1919) and Balair (founded in 1925) merged to form Swissair. In 1947 Swissair started a transatlantic service to New York and in May, 1954 the network was extended to include Brazil. In Europe, Swissair serves all the main capitals, including Prague and Belgrade, and services are also flown to Turkey, Lebanon, Persia, Syria, Saudi Arabia, Kuwait, Iraq, Israel and Egypt. Long-haul services are flown to New York, Rio de Janeiro, Buenos Aires and Tokyo. Seventy per cent. of the capital is held by Swiss citizens and 30% by the Confederation, the Cantons and communities.

The fleet consists of five DC-7Cs, seven DC-6Bs, one DC-6A, 11 Convair 440s and eight DC-3s (one cargo). On order are three DC-8s.

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seven Convair 600 Coronados (two to be leased to S.A.S.) and four Caravelles (to be leased from S.A.S.).

Chairman, Ernst Schmidheiny; deputy chairmen, Prof. Eduard Amstutz and Edgar Primault; president, Dr. Walter Berchtold; vice-presidents: finances and economics, Eugen Groh; traffic and sales, Lucien Leo Ambord; operations, Robert Fretz; engineering and maintenance, Isidor Lack; personnel, Dr. Charles-Frédérick Ducommun; planning and research, Armin Baltensweiler; secretary general, Dr. Heinz Haas.

TURKEY

Turk Hava Yollari, A.O.—Cankiri Caddesi 88, Ankara.

T.H.Y. was formed in March, 1956, to take over from Turkish State Airlines (Devlet Hava Yollari) which was founded in 1933 and was originally a unit in the Air Force. It is financed by Government and private capital. It operates over an extensive domestic network and to Nicosia, Beirut, Athens and Rome.

The fleet in 1958 consisted of five Viscount 794s and 21 DC-3s.

General manager, Ulvi Yenal; asst. general manager, Hüseyin Unsal. Managers: operations, Sulphi Isçen; technical, Hüseyin Yegin; commercial, Cemal Ozcivelek.

UNITED KINGDOM

Air Charter, Ltd.—
See under Airwork Group.

Airwork Group.—Airwork House, 35 Piccadilly, London, W.1.

Oldest of the British independent companies, Airwork, formed in October, 1928, now heads a group of associates and subsidiaries including the following operating companies: Air Charter, Ltd.; Commercial Air Services (Pty.), Ltd., of Johannesburg; Commercial Air Services (Rhodesia), Ltd.; Fison-Airwork, Ltd.; Morton Air Services, Ltd.; Olley Air Service, Ltd.; Straits Air Freight Express, Ltd., of New Zealand; and Transair, Ltd.

Scheduled services operated from the U.K. by group members are: the "Viscount Safari" services to East, West and Central Africa (Airwork, with Hunting-Clan); the Channel Air Bridge from Southend to Rotterdam, Calais and Ostend (Air Charter); routes to Swansea, Milford Haven, Le Touquet and Rotterdam, and seasonal services to the Channel Islands, Newmarket and other race meetings (Morton and Olley); a seasonal service to Jersey, and mail and newspaper services to Paris, the Channel Islands, Dusseldorf and Hanover (Transair). Inclusive tour and other special services are operated.

The group's U.K.-based fleet (fixed-wing) consists of two Britannia 307s, two Viscount 831s, three Viscount 804s, three DC-4s, eight Bristol 170 Mk. 32s, six DC-3s, two D.H. Herons, six D.H. Doves and three D.H. Rapides.

Executives (Airwork): President, T. L. E. B. Guinness, O.B.E.; chairman and managing director, M. D. N. Wyatt, C.B.E.; director and secretary, R. L. Cumming; general manager, W. K. Davison; sales manager, L. R. E. Castlemaine; commercial manager, K. R. Sangster. Managing director, Airwork Services, Ltd., engineering subsidiary, R. W. Cantello.

Air Charter (21 Wigmore Street, London, W.1; flying base, Southend Airport): Managing director, F. A. Laker; operations manager and chief pilot, Capt. E. N. Jennings; commercial manager, G. W. Forster. Channel Air Bridge manager, D. A. Whybrow. Engineering manager, Aviation Traders (Engineering), Ltd., J. Wiseman.

Morton Air Services (Gatwick Airport): Chairman and managing director, T. W. Morton; secretary, J. J. Farabee; chief pilot, Capt. T. J. Gunn; chief engineer, A. J. McFie; charter manager, S. A. Carter; sales manager, P. L. Eskell. (Morton's engineering associate is Morton Engineering Services, Ltd.).

Olley Air Service (Gatwick Airport): Chairman, T. W. Morton; secretary and commercial manager, S. A. Carter. Others as for Morton.

Transair (Gatwick Airport): Chairman and managing director, G. H. Freeman; operations manager, Capt. C. W. H. Bebb; chief pilot, Capt. S. G. Webster; chief engineer, D. L. Brooks; technical manager, W. Richardson; commercial manager, H. S. Perren.

B.K.S. Air Transport, Ltd.—Berk House, Baker St., London, W.1.

Formed in 1952 as B.K.S. Aerocharter, B.K.S. Air Transport operates scheduled services over a considerable network. From Newcastle services are flown via Leeds/Bradford to Dublin and Rotterdam/Dusseldorf, and to Edinburgh and Belfast. London and Jersey; from Leeds/Bradford services are operated to Belfast, Jersey and Newcastle. A number of seasonal services are also operated.

The fleet consists of three DC-3s, three Airspeed Elizabethans and one Bristol 170 Mk. 31.

Directors, C. J. Stevens (managing) and J. N. Barnby. Commercial manager, A. Selby Lowndes; chief pilot, H. W. Ayre; secretary, J. Beer.

British Aviation Services, Ltd.—Silver City House, 62 Brompton Road, London, S.W.3.

B.A.S. embraces Silver City Airways, Ltd., Britavia, Ltd., Aquila Airways, Ltd., Air Kruise Ltd, Manx Airlines Ltd., Manx Aero Engineering Ltd., Inclusive Tours, Ltd., Dragon Airways, Ltd., Roadair-Railair Ltd., Silver Arrow, Ltd., and British Aviation Services (Engineering), Ltd. A majority shareholding in the group is held by the P. and O. shipping group.

Silver City is best known for its vehicle and passenger ferry services, which operate all the year round from Lydd to Le Touquet, Calais and Ostend, and from Southampton to Cherbourg and Deauville. Passenger services flown all the year round are from Newcastle to Amsterdam and Dusseldorf, between Glasgow, Edinburgh and the Isle of Man, and between Blackpool, Belfast and Dublin. Seasonal services are flown from Blackpool to Ostend, Belfast, Jersey and Newcastle; from Newcastle to Brussels and the Isle of Man; from Leeds/Bradford to Jersey and the Isle of Man, and from Birmingham, Glasgow, Edinburgh and Carlisle to the Isle of Man. A London-Paris rail-air service is operated in conjunction with French Railways.

The combined fleet consists of 14 Bristol 170 Mk. 32s, six Bristol 170 Mk. 21s, nine DC-3s, five Hermes and two D.H. Herons.

Chairman, Eoin C. Mekie, C.B.E.; dep. managing director and general manager, A.V.M. S. D. Macdonald, C.B., C.B.E., D.F.C.; financial controller, C. M. Fox, O.B.E. Executives of Silver City are: chairman and joint managing director, Eoin C. Mekie, C.B.E.; joint managing director, H. C. Kennard, D.F.C.; secretary, A. E. Barnes; technical director, M. D. Day; financial controller, C. M. Fox, O.B.E.; commercial director, W. G. Franklin; operations director, W. E. Horsflesh.

British European Airways Corporation.—Keyline House, South Ruislip, Middx.

Following the Civil Aviation Act, B.E.A. was formed on August 1, 1946. It is responsible for most of the British scheduled passenger, mail and freight services to the main cities of Europe and within the U.K. The Corporation flies internationally to all points in Western Europe including Berlin; to Belgrade, Warsaw, Prague and Moscow; and to Malta, Cyprus, Tel Aviv, Ankara and Istanbul. Services to North Africa are flown from Malta; and to Kuwait and Bahrein by agreement with Cyprus Airways.

At mid-1959 the fleet consisted of 24 Viscount 701s, 21 Viscount 802s, 18 Viscount 806s, 41 DC-3s, three D.H. Rapides, two D.H. Herons and five helicopters. On order were 20 Vanguards, six D.H. Comet 4Bs and 24 D.H. 121s.

Chairman, Lord Douglas of Kirtleside, G.C.B., M.C., D.F.C.; deputy chairman, Sir John Keeling; chief executive, Anthony H. Milward, O.B.E.; commercial and sales director, P. C. F. Lawton, D.F.C.; chief engineer, B. S. Shenstone; financial controller, R. L. Weir, O.B.E.; flight operations and communications director, J. W. G. James, O.B.E.; traffic director, E. P. Whitfield, O.B.E.

British Overseas Airways Corporation.—B.O.A.C. Headquarters, London Airport, Hounslow, Middx.

The Corporation was formed under the British Overseas Airways Act of 1939 to take over Imperial Airways and British Airways with effect from April 1, 1940. Its history goes back, through Imperial Airways, to August, 1919, when Aircraft Transport and Travel started London-Paris services.

B.O.A.C.'s routes east and south from the U.K. and Europe serve the Near East, Africa, the Middle East, Pakistan, India, Ceylon, Burma, Thailand, Malaya, Singapore, Hong Kong, Indonesia, Japan and Australia. Services westwards operate to Canada and the U.S.A. east and west coasts and to the Caribbean and Venezuela. In 1958, B.O.A.C. inaugurated the World's first turbojet service across the North Atlantic and is now operating also across the Pacific with Britannias to complete a round-the-World service. Comet 4s are also used on the services to Hong Kong and Tokyo, are now operating to Australia and will shortly be flying to South Africa. A service through South America to Chile is due to start on January 25.

The fleet at September 30 consisted of two Argonauts, 15 Britannia 102s, 17 Britannia 312s, 10 DC-7Cs, five Stratocruisers and 15 Comet 4s. On order were four more Comet 4s, 15 707-420s and 35 V.C.10s.

Chairman, Sir Gerald d'Erlanger, C.B.E.; deputy chairman, Sir George Cribbett, K.B.E., C.M.G.; managing director, Basil Smallpeice; deputy managing director, Keith Granville, C.B.E.; chief of flight operations, Capt. T. H. Farnsworth; chief engineer, C. Abell, O.B.E.; chief commercial manager, G. H. C. Lee; general manager, eastern routes, B. W. Bampfylde; general manager, western routes, J. R. Stainton; general manager, southern routes, D. H. Glover; financial comptroller, K. W. Bevan; director of personnel and medical services, Dr. K. G. Bergin; secretary, K. H. Staple.

Cambrian Airways, Ltd.—Cardiff (Rhoose) Airport, nr. Barry, Glam.

Cambrian was formed in 1936 as Cambrian Air Services, Ltd., and the present name was adopted in May, 1955. Charter operations started in January, 1946, and scheduled operations in 1948. In February, 1958, B.E.A. acquired a 33⅓% interest. After the 1958 summer season, services, except Manchester-Cardiff-Bristol-Jersey, were suspended. Cardiff-Bristol-Channel Islands, Liverpool-Channel Islands and Cardiff/Bristol/Southampton-Paris services were restarted in March, 1959, with an all-DC-3 fleet. This month the Manchester service (connecting with B.E.A. services to Belfast and Glasgow) was restarted and in 1960 direct services to Belfast and Dinard will be operated.

The fleet consists of three DC-3s and one D.H. Heron 2; a fourth DC-3 will be delivered in January.

Chairman, J. Morgan; managing director, L. B. Elwin; director and secretary, W. W. Stanley; operations manager, B. J. T. Callan; chief engineer, R. H. Boutcher.

Derby Aviation, Ltd. (Derby Airways).—78 Buckingham Gate, London, S.W.1.

Derby Aviation was formed in 1949. Scheduled services are operated from Derby, Northampton, Cambridge, Luton and Staverton (Cheltenham) to the Channel Isles, and from Derby to the Isle of Man, Ostend (via Birmingham), and Glasgow. Continental scheduled services are also operated from Cardiff and Birmingham. Inclusive tour services are operated.

The fleet consists of five DC-3s and four Marathons, with three Ansons for survey work and light aircraft for training and communications.

Chairman, Gp. Capt. C. A. B. Wilcock, O.B.E., A.F.C., A.F.R.Ae.S., M.P. Directors, Mrs. J. Harben Grice, Wg. Cdr. H. A. Roxburgh, R. R. Paine and D. W. T. Sullivan. Secretary, M. Ager; commercial manager, A. C. Felts; chief pilot, Capt. R. Milsom; operations superintendent, Capt. S. D. Fenton; chief engineer, K. W. Felts; traffic manager, D. Aldridge.

Don Everall (Aviation), Ltd.—Elmdon Airport, Birmingham.

This company operates scheduled services from Birmingham and Coventry to the Channel Islands, in addition to general charters.

The fleet consists of two DC-3s and two D.H. Rapides.

Directors, D. Everall and C. Everall; general manager, E. Holden; operations manager and chief pilot, Capt. A. L. Firmin; commercial manager, M. J. Bastick.

Eagle Airways, Ltd.—Marble Arch House, 40 Edgware Road, London, W.2.

This company was founded in 1953 to undertake the scheduled services of the Eagle group; charter and trooping activities are handled by Eagle Aviation. Eagle is licensed to operate services from London to Pisa, Rimini, Innsbruck, Luxembourg, Basle (air rail), Jersey, Dinard, La Baule and Ostend; from Manchester to Ostend and Bergen; and from Birmingham to Palma.

The combined fleet of the Eagle companies consists of 12 Vikings, three DC-6Cs, one Viscount 805 and one Bristol 170.

Chairman and managing director, Harold Bamberg; deputy managing director, M. A. Guinane. Directors: Maj.-Gen. C. G. B. Greaves, C.B., C.B.E.; N. Ashton Hill, M.B.E., LL.B., T.D.; G. D. Peacock; G. W. Pitt, M.B.E.; J. H. Sauvage, D.S.O., D.F.C. Commercial manager, J. T. Hutton; sales manager, J. Lovegrove; reservations manager, H. W. Vickers; tariffs manager, N. Thompson; publicity manager, C. G. Worrall.

Eagle Airways (Bermuda), Ltd.—See America (Central and South).

Eagle Aviation, Ltd.—Marble Arch House, 40 Edgware Road, London, W.2.

Founded in 1948, Eagle Aviation operates charter, trooping and inclusive tour services. It also plans to operate scheduled passenger and freight Colonial Coach Class services to a number of British overseas territories at approximately half the present tourist fares, using DC-6Cs initially.

Directors as for Eagle Airways.

East Anglian Flying Services, Ltd.—The Airport, Southend-on-Sea, Essex.

Operating as Channel Airways, this company was formed in 1946. Scheduled services are operated from Ipswich, Southend, Shoreham and Portsmouth to the Channel Islands, Paris, Ostend, Rotterdam, Le Touquet and Antwerp. The fleet consists of four Vikings, two Bristol 170s, four D.H. Doves and two D.H. Rapides.

Managing director, R. J. Jones, A.F.C.; operations manager, A. E. Hugo Parsons; chief engineer, T. Atkins.

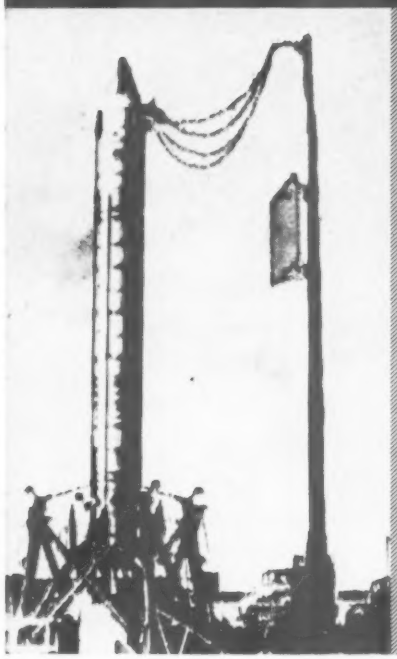
Hunting-Clan Air Transport, Ltd.—London Airport, Hounslow, Middlesex.

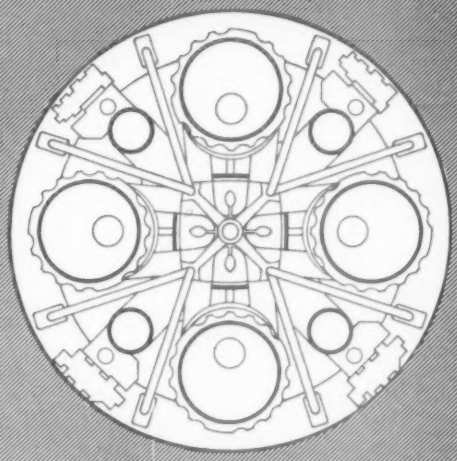
Formed in January, 1946, as Hunting Air Travel, this operator was the first of the British independents to restart civil charter flying after the war. In October, 1953, the Hunting Group and the Clan Line (now part of British and Commonwealth Shipping Co., Ltd.) joined forces to found the present company.

"Safari" Colonial Coach scheduled services are operated by Hunting-Clan, in conjunction with Airwork, to East and Central Africa, and "Safari" Tourist Class Services to West Africa. H.C.A. also operates Africargo, the only all-freight service between Britain and Africa, and a Colonial Coach

(Continued on page 487)

Gamma rocket engine delivers 19,000-lb thrust outside the earth's atmosphere – for a weight of under 700lb . . .





End view showing combustion chambers which can be inclined for vehicle guidance.

...ANOTHER ENGINEERING ADVANCE BY BRISTOL SIDDELEY

One of the largest manufacturers of motive power units in the world, Bristol Siddeley Engines Limited produce the Gamma. A liquid propellent rocket engine, the Gamma delivers 16,400-lb thrust (7,438 kg) at sea level rising to 19,000 lb (8,618 kg) outside the earth's atmosphere for a total engine bay weight of under 700 lb.

The Bristol Siddeley Gamma has four gimbal-mounted combustion chambers which are hydraulically actuated for vehicle guidance. Each combustion chamber is fed with propellents by its own turbopump unit and the four units are joined at the centre by a common manifold. The Gamma burns hydrogen peroxide (HTP) with kerosene and uses silver-plated nickel gauze as a catalyst to decompose the HTP into oxygen and superheated steam.

Gamma powers Black Knight

The Bristol Siddeley Gamma powers the Saunders-Roe Black Knight, Britain's highly successful space research vehicle. The Gamma has proved itself to be exceptionally reliable. In fact, in all firings to date Black Knight has never failed to start, and has reached a height of over 500 miles above the Woomera rocket range in Australia.

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Guide to the World's Airlines

(*Continued from page* 468)

Class service to Gibraltar. In 1959 Hunting-Clan was awarded long-term Air Ministry contracts for the transport of Service personnel and their families to and from the Far East, East Africa, Aden and Cyprus, using Britannias and Douglas DC-6Cs. An associate company, Hunting-Clan Air-services, Ltd., operates a network of inclusive tour services.

The fleet at mid-1959 consisted of two Britannia 317s (for British and Commonwealth Shipping), three Viscount 833s, two Viscount 732s, two Douglas DC-6Cs, three Douglas DC-3s and seven Vikings.

Chairman, P. LI. Hunting; managing director, M. H. Curtis; executive director, Capt. L. B. Greensted, M.B.E.; secretary, E. H. Baker; sales manager, D. J. Platt.

Jersey Airlines — Airlines (Jersey), Ltd.—States Airport, Jersey, C.I.

Jersey Airlines, formed in 1949, is, through Jersey Airlines Development Corporation, Ltd., associated with B.E.A., which has a 25% interest. Services are operated from the Channel Islands to London, Southampton, Bournemouth, Exeter, Coventry, Manchester, Paris and points in northern France, and directly between the provincial centres and France.

The fleet consists of six D.H. Herons, three DC-3s and one D.H. Rapide.

Chairman and managing director, M. L. Thomas; director of operations, Capt. B. W. Gardiner; director of engineering, T. C. Chandler; chief pilot, Capt. J. A. Spencer; chief engineer, I. M. Paisnel; secretary, H. F. Popham.

Morton Air Services, Ltd.
See Airwork Group.

North-South Airlines, Ltd.—Leeds-Bradford Airport, Yeadon, Yorks.

North-South operates summer services between Leeds/Bradford, Exeter, Bournemouth and Sandown, I.o.W. The fleet consists of one D.H. Heron 1B.

Directors: G. G. Rennard (managing) and B. H. Rennard.

Olley Air Service, Ltd.
See Airwork Group.

Scottish Airlines (Prestwick), Ltd.—Prestwick Airport, Ayrshire.

This is a subsidiary of Scottish Aviation, Ltd., which was formed in 1935. The company operates services to the Isle of Man. The fleet consists of one DC-3 and one Twin Pioneer.

Chairman, The Duke of Hamilton; general manager, I. C. Grant; secretary, D. McConnell; London manager, J. L. Speirs; technical supt., W. A. Wilkinson.

Silver City Airways, Ltd.
See British Aviation Services.

Skyways, Ltd., and **Skyways Coach Air, Ltd.**—7 Berkeley Street, London, W.1.

Skyways operates a scheduled colonial coach service from London via Malta, to Cyprus and a direct service to Tunis/Malta. A scheduled animal transport service is operated between the U.K. and France.

Skyways Coach Air operates services London - Lympne - Beauvais - Paris, London - Lympne - Vichy - Montpellier and London - Lympne - Lyons - Nice. Services are also flown to Dijon and Tours.

At mid-1959 the fleet included four 1-749s, eight Hermes, 14 Yorks, six DC-3s and a D.H. Rapide.

Chairman, Sir Wavell Wakefield, M.P.; managing director, Eric Rylands; directors, C. F. Dickson, O.B.E., D. J. Bibby, M.C., L. O'B. Harding. General managers: administration, J. M. Twiss; commercial, H. P. Snelling; Coach Air, Ltd., R. Birkett, M.V.O., D.F.C.; financial, V. J. Doel. Secretary, D. J. Davies; head public relations and asst. to managing director, Mrs. E. Whittaker; operations manager, Capt. J. S. Michie.

Starways, Ltd.—Liverpool Airport, Liverpool 24.

Primarily a charter operator, Starways started scheduled flying in 1955 and operates services between Liverpool and London, and, seasonally, from Glasgow, Manchester and Liverpool to Newquay.

The fleet consists of three DC-3s and two DC-4s.

Chairman, F. H. Wilson, O.B.E.; directors, J. A. Wilson, A. M. Wilson and Capt. G. K. Leigh; traffic manager, J. M. Kent.

Tradair, Ltd.—Prince Rupert House, 64 Queen St., London, E.C.4.

A new name in the scheduled airline business, Tradair is now operating a once-weekly Southend-Groningen (Netherlands) service. Tradair, operating from Southend, was registered in November, 1957.

The fleet consists of eight Vikings.

Directors: commercial, Eric S. Hanss; technical, L. N. Monnickendam; operations, Capt. J. L. T. Allen.

Transair, Ltd.—See Airwork Group.

Aeroflot's turboprop Il-18s entered service last April on the Moscow-Adler/Sochi (Caucasia) route. The aircraft on the inaugural service is seen here at Adler Airport.

UNION OF SOVIET SOCIALIST REPUBLICS

Aeroflot. — Chief Administration of the Civil Air Fleet under the Council of Ministers of the U.S.S.R. —Ulitza Razina 9, Moscow.

The state-controlled airline of Soviet Russia, Aeroflot is, in effect, responsible for all civil aviation work and development in the country. It was established in 1932, in succession to Debrolet, as the multi-national Soviet airline, though the Mongolian Republic has its own air transport administration.

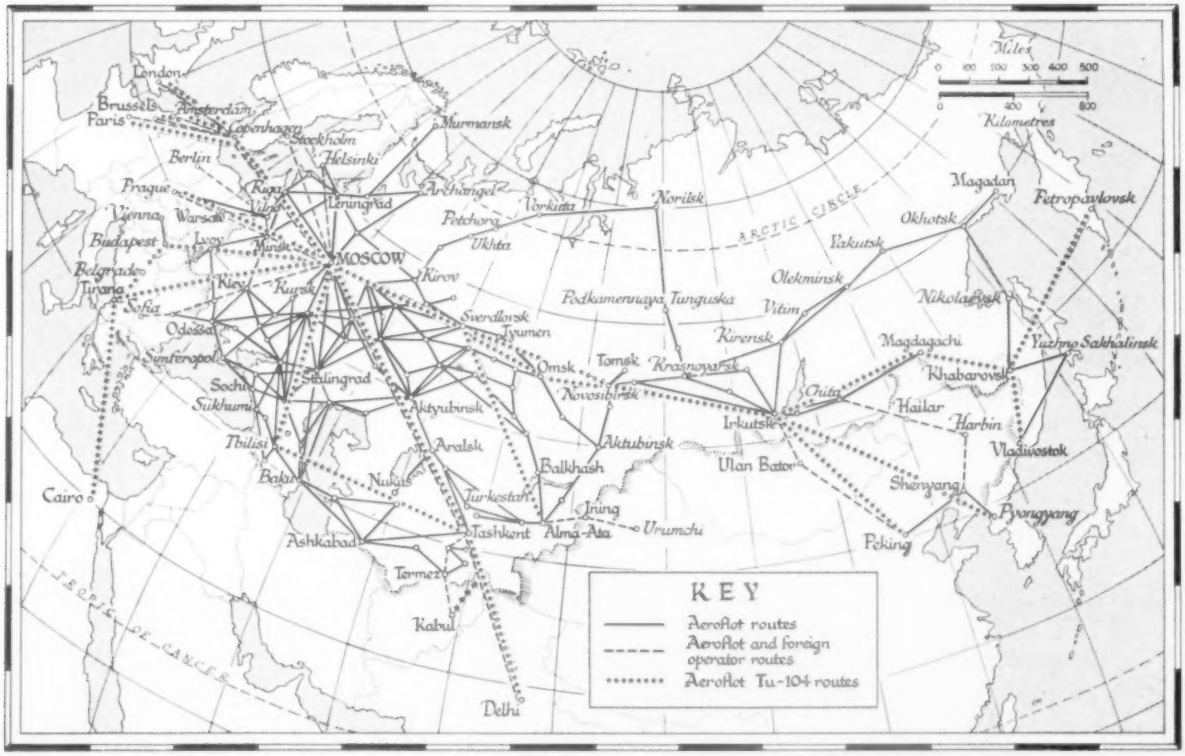
Until Aeroflot started to operate international services in addition to those to China, very little was known about its fleet or its organization. It was known that a large domestic network had been developed, using a variety of aircraft types, including large numbers of twin-engined Il-12s and Il-14s. During the past two years the development of competitive turbine-engined aircraft and the changes in the political climate have led to an expansion of international operations.

No statistics are available to provide a yardstick against which Aeroflot's work can be measured, but the published (and approximate) figures show the operations to be on a large, but not phenomenal, scale when compared with those of the airlines of the west. For instance, Aeroflot is reliably reported to have carried about 9 million passengers in 1958; this is not so very much more than the number carried by one of the four biggest U.S. operators which, between them, carried 27 million passengers last year. The Aeroflot route network, at about 350,000 miles, is certainly the longest of any single operator.

Aeroflot's network takes in some 130 major cities, and international services are now operated to Budapest, Prague, Copenhagen, Amsterdam, Brussels, Paris, London, Cairo, Kabul, Delhi, Peking and points in China and North Korea.

The fleet at mid-1959 included approximately 100 Tu-104s, 20 Tu-104Bs, 50 Il-18s, 25 An-10/10As, four Tu-114s and 1,600 Il-12/14s.

Chief of civil aviation, Col.-Gen. E. F. Loginov; deputy chief of Aeroflot, Col. V. F. Bashkirov; chief of international operations, V. M. Danilichev.



Astronautics and Missiles

Getting Man into Space

TWO research programmes, the X-15 rocket aircraft and the Project Mercury manned satellite, are playing leading rôles in the American space-research programme. Basically, the X-15 is an advanced rocket-powered research aircraft intended to reach heights of up to 500,000 ft. and speeds of 3,600 m.p.h.; it will not go into orbit, although it will allow short-period zero-*g* flight and the re-entry problems of lifting vehicles to be studied.

The Mercury capsule will be launched by an Atlas ICBM and will go into orbit as a satellite; it will thus allow man's reactions to prolonged zero-*g* flight to be studied. But the capsule's course cannot be influenced by its occupant—he can only control the attitude of the capsule. And re-entry will be uncontrolled after the retro-rockets have been fired; its ballistic re-entry will be similar to that of a missile warhead, and the pilot will have no control over his landing point.

Both the Mercury and X-15 programmes will contribute to the design of DynaSoar, a military vehicle which will combine features of both. A lifting re-entry vehicle, it will be boosted into orbit, thus becoming a manned satellite which can re-enter and land under the control of its pilot.

The X-15 programme began in 1952 when NACA directed its laboratories to study problems of flight beyond the atmosphere and ways of investigating them. Studies by laboratory techniques, missiles and manned aircraft were considered and a decision made in favour of the manned research aircraft.

Early in 1954 a NACA team was set up to decide the characteristics of such an aircraft and the feasibility of its construction. It would have to reach very high speeds and altitudes for studies of aerodynamic heating, stability and control, as well as the psychological and physiological effects of hypersonic and space flight on pilots.

At this time similar studies were being made by the U.S. Air Force and U.S. Navy. Following discussion with the Service research and development groups, it was decided to adopt the NACA proposal as a joint U.S.A.F.-U.S.N.-NACA programme.

In December, 1954, manufacturers of high-speed aircraft were asked to take part in the X-15 design competition. During the summer and autumn of 1955 the competitive designs were assessed and in December of that year North American Aviation Inc. was given a contract to build three aircraft.

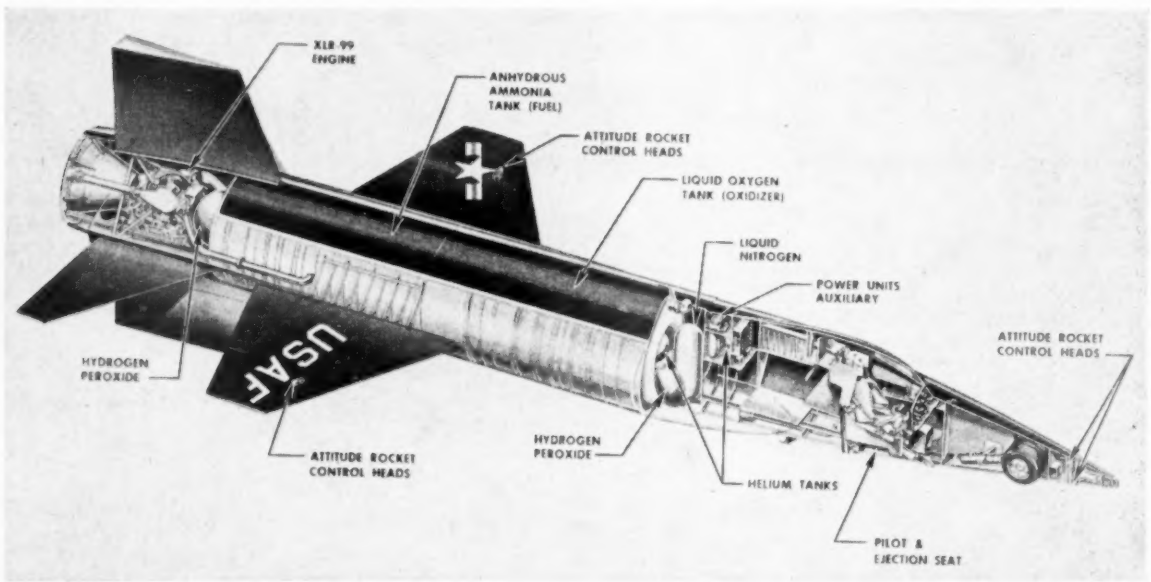
After thorough wind-tunnel and component tests, construction of the first aircraft began in 1957 and was completed in October, 1958. The first "captive" flight beneath the wing of a B-52 bomber was made on March 10 this year. Three more captive flights were made before the aircraft was released for a free glide flight on June 8.

The first powered flight was on September 17 and the second on October 17; during these the X-15 flew at speeds up to 1,500 m.p.h. During the third powered flight on November 5 an engine explosion occurred and an emergency landing was made. These initial flights are being made by Mr. Scott Crossfield of North American to prove the aircraft's stability, control, structure and systems. After this NASA and Service test pilots will fly the aircraft during its research programme.

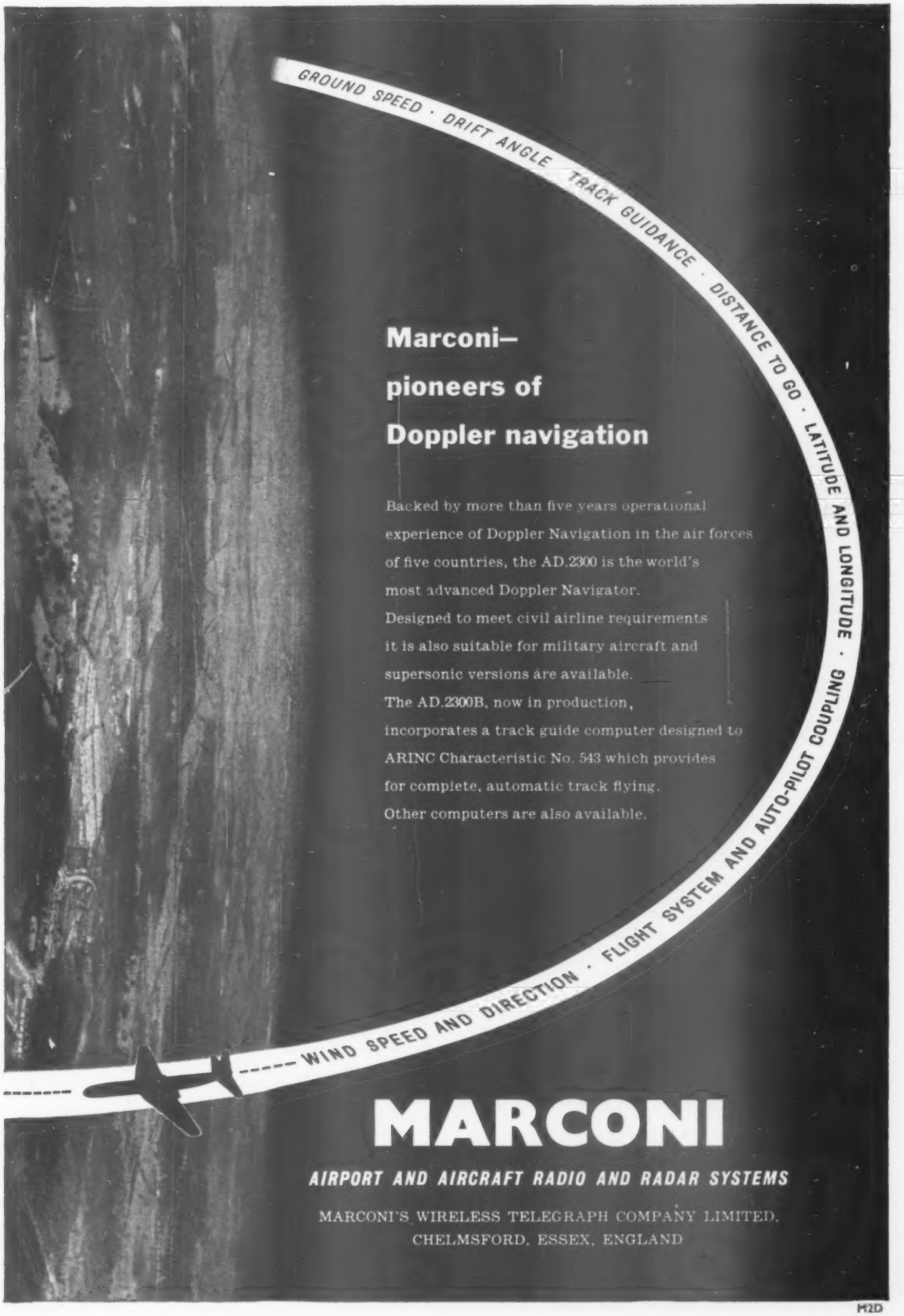
Layout and Structure

Basically conventional in layout, the X-15 is the culmination of a long line of U.S. research aircraft whose descent can be traced back to the Bell X-1 of the immediate post-War years. It is 50 ft. long and has a 22-ft. wing span. Its short-span trapezoidal wings carry flaps but no ailerons; pitch and roll control are both provided by the power-operated tailplane whose units move differentially for roll control. Large fairings along the fuselage side give the fuselage extreme width, and the span of the tailplane is only slightly less than the wing span.

(*Continued on page 489*)



FLYING FUEL TANK.—Nearly 59% of the X-15's launching weight is made up of propellents for its rocket engine.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(*Continued from page 488*)

An unusual feature is the wedge-shaped fin whose trailing-edge is about a foot thick. This is to give directional stability at very high speeds. The fin extends above and below the fuselage and contains airbrakes. Its ventral section is jettisoned before the X-15 lands on retractable skids which are housed just beneath the tail. The nosewheel has conventional twin wheels.

During test flights the X-15 may experience temperatures ranging from +1,200° F. to −300° F. To withstand these temperatures a nickel alloy steel, Inconel X, was chosen for the outer surface. Considerable development of techniques was necessary in applying this material to the aircraft, and in particular there were problems regarding the welding methods used. About 65% of the X-15 structure is welded and all the welds are X-rayed to check that they are up to specification.

All external surfaces are made of Inconel X, but the primary structure is of titanium and stainless steel, with aluminium alloy used where heat and high loads are no problems. The wing has a solid heat-sink leading-edge of Inconel X.

Development of the X-15 has been a major programme—it will have cost £45 million by mid-1960—and more than 300 U.S. companies are involved, with North American as the prime contractor.

Power and Systems

For initial flights the power is supplied by two XLR11 rocket engines produced by the Reaction Motors division of Thiokol. These two engines—of the same type as used in the X-1—provide 16,000 lb. of thrust. Their propellents are oxygen and water-alcohol.

For later flights the X-15 will have a single Reaction Motors XLR 99 rocket engine providing about 60,000 lb. of thrust. This will allow the aircraft to approach its limiting performance. It has been designed as a throttleable unit which can be stopped and restarted in flight. An automatic system cuts the engine off if there is any malfunction.

At launch 58.6% of the X-15's all-up weight is made up of propellents; at full throttle the engine consumes these at more than 10,000 lb. per minute. A turbopump, driven by decomposed hydrogen peroxide, supplies the propellents to the engine.

Hydraulic and electric power for the X-15 is provided by two General Electric auxiliary power units, each weighing only 48 lb. These small turbine power units are driven by a mixture of steam and oxygen produced by the catalytic decomposition of hydrogen peroxide; they operate independently of the rocket motor and are the sole source of power during the aircraft's ballistic trajectory and return glide to Earth.

Each of these 40-h.p. units produces 4 kVA. of 400-c.p.s. 115-volt A.C. electric power and a hydraulic flow of 16 g.p.m. at 3,000 p.s.i. They are designed to operate at temperatures between −40° F. and +400° F. The electric power is needed for the 1,300-lb. instrument payload, for heating elements throughout the aircraft and in the pilot's pressure suit, for the inertial guidance system and its computers and for communication, telemetry and recording equipment. The hydraulic power operates airbrakes, flaps and control surfaces.

ESCAPE SYSTEM.—Stabilizing fins and a telescopic blast shield are features of the rocket-fired ejector seat in which the X-15 pilot sits.

The primary flight controls of the X-15 are power-operated by irreversible jacks and an artificial feel system is provided. A new Westinghouse stability-augmentation system also feeds signals into the control circuit.

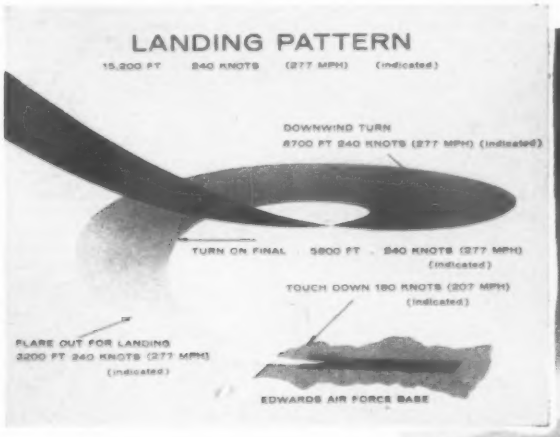
During ballistic flight the X-15 is controlled in attitude by control jets developed by Bell Aircraft. There are 12 of these hydrogen-peroxide-fuelled jet nozzles in all, eight in the nose and four in the wings. They produce enough thrust—40 to 110 lb.—to control the aircraft's attitude. Pitch and yaw are controlled by the nose jets and roll by those at the wingtips. A three-axis control stick in the cockpit actuates the jets.

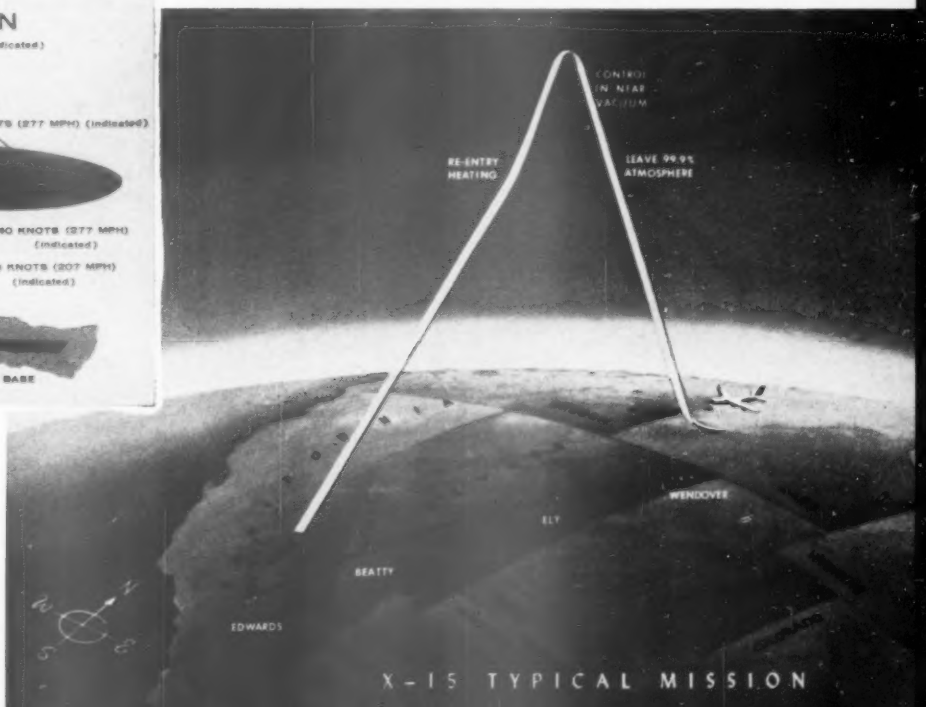
An advanced pressurization and cooling system is used; it relies on an AiResearch liquid nitrogen storage and feed system. At the heights the aircraft will reach a self-contained system is essential.

Liquid nitrogen, at about −300° F., cools the cockpit and electronics and maintains environmental pressure. Equipment cooling and pressurization takes 95% of the nitrogen, only 5% being needed for the pilot.

Cockpit control depends on a Sperry inertial guidance system with a Lear-instrument display. This system gives information on aircraft altitude, speed, distance travelled and height. The pilot's instrument panel also gives information about rate of climb or descent and engine performance.

There are control consoles on both sides of the cockpit.


LANDING PATTERN
15,200 FT 340 KNOTS (277 MPH) (indicated)
DOWNWIND TURN
8700 FT 240 KNOTS (277 MPH) (indicated)
TURN ON FINAL 5800 FT 240 KNOTS (277 MPH) (indicated)
TOUCH DOWN 180 KNOTS (207 MPH) (indicated)
FLARE OUT FOR LANDING
3200 FT 240 KNOTS (277 MPH) (indicated)
EDWARDS AIR FORCE BASE



HIGH RANGE.—This is the area over which the X-15 will fly on its peak-performance flights; its landing pattern is shown above.

ON ITS OWN.—The X-15 is carried up to 38,000 ft. beneath a B-52 bomber before it is released for its test programme.

On the left-hand one are the ballistic attitude-control stick and the powerplant controls. On the right-hand console are communication switches, navigational aids and a miniature aerodynamic control stick which can be operated by wrist movements during high-*g* flight. This stick works in unison with a conventional centrally mounted control stick.

The X-15's pilot wears an MC-2 full pressure suit—virtually a pressure cabin in miniature. It is a lightweight non-rigid garment constructed of slip-knit nylon fabric with an aluminized outer cover. This pressure suit is designed to allow the pilot full freedom of movement. It includes 24 electrical contacts for connections between physiological sensors and telemetry transmitters. Helmet and suit pressures and the cockpit and pilot's body temperatures are also measured.

For emergency escape the pilot uses an ejection seat in conjunction with his full pressure suit. Design requirements called for the seat to be usable on the ground at a speed of 90 knots and up to an altitude of 120,000 ft. and a speed of Mach 4. It must protect the pilot against aerodynamic heating, pressure loss, wind blast and excessive accelerations.

The seat is ejected by a rocket and stabilized in flight by two folding fins and two telescopic booms. Ejection is initiated by squeezing control levers on each side of the seat; the canopy then separates from the cockpit and immediately afterwards the ejection rocket is fired. After ejection the pilot remains in the seat until it falls to 15,000 ft., or for three seconds if ejection is below that height.

An aneroid timer releases the restraining harness and deploys the pilot's 24-ft. parachute. The seat has been tested on high-speed rocket sleds at Edwards AFB.

Test Programme

As already mentioned, initial flights of the X-15 have been from Edwards AFB in California, where a dry lake bed gives several miles of usable landing strip. For its later maximum-performance flights the aircraft will fly in an aerial corridor 485 miles long and 50 miles wide between Wendover AFB in Utah and Edwards AFB in California. This area, over mountains and arid desert, is known as High Range; the U.S.A.F. and NASA have installed radar and telemetry equipment so that the craft can be kept under constant surveillance during its peak-performance tests.

During flight information on more than 1,000 aspects of the X-15 and its pilot's behaviour will be recorded and critical information will be telemetered to ground stations. A flight surgeon will watch a graph of the pilot's body temperatures and radiocardiograph of his heart action. Engineers will measure critical temperatures and pressures such as those in the fuel pipes and engine so that information on any malfunctions can be transmitted to the pilot.

On maximum-performance flights the X-15 will be launched mid-way between Wendover AFB and a radar station at Ely, Nevada. It will be dropped at about 38,000 ft. and Mach 0.8 (500 m.p.h.). The XLR 99 rocket motor will fire for 88 seconds, accelerating the craft to about 3,600 m.p.h. On maximum-altitude flights the aircraft should reach 500,000 ft.

On return to the atmosphere a 7.33 *g* pull-out will be made at heights between 115,000 and 65,000 ft. about 300 sec. after the launch. Total free-flight time of the X-15 will be about 25 minutes and the maximum range 400 naut. miles.*

As part of the physiological checks on human reaction to space flight, pilots will occasionally be rushed after high-altitude flights to the Los Alamos Scientific Laboratory, which is 70 miles north of Albuquerque, where their exposure to cosmic-ray activity can be measured by a simple technique taking only three minutes.

Clearly the X15's ambitious programme will take many months to complete. Few if any aircraft in the past have represented such a large advance in performance. Results of this programme are likely to be even more useful than those from the earlier X-series research aircraft.

Technical Data

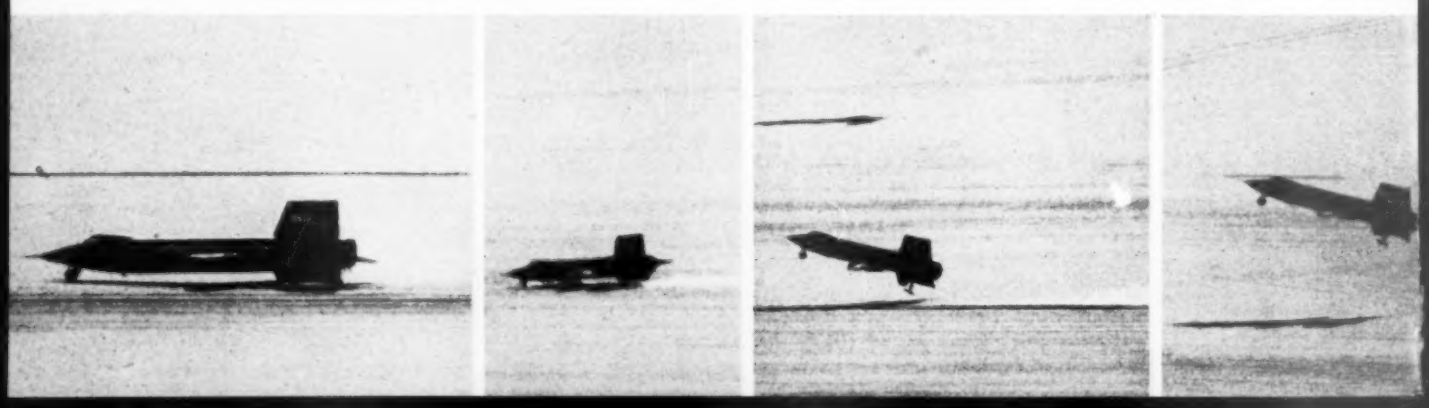
DIMENSIONS.—Length, 50 ft.; span, 22 ft.; height, 13 ft.; wing sweep, 25°; wing area, 200 sq. ft.; wing thickness, 5%; aspect ratio, 2.5.

WEIGHTS.—Launching weight, 31,275 lb.; burn-out weight, 12,971 lb.; usable propellent, 18,304 lb.

POWERPLANTS.—Initial: two Reaction Motors XLR 11-5 rocket engines, each giving 8,000 lb. of thrust; propellents, water-alcohol and liquid oxygen. Final: one XLR 99-RM-1 throttleable rocket engine giving more than 50,000 lb. of thrust; propellents, anhydrous ammonia and liquid oxygen.

DESERT TOUCHDOWN.—A dead-stick landing is made by the X-15 on the dry lake bed at Edwards AFB; after touching down on skids the aircraft pitches forward rapidly onto its nose wheels.

* A detailed assessment of the X-15's performance potential was published in our issue of November 14, 1958.



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Lufthansa
Philippine Airlines
Qantas Empire Airways
Rijksluchvaart School, Netherlands
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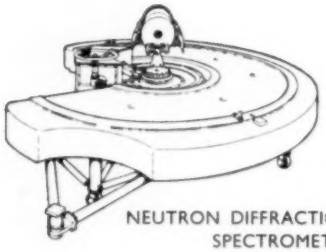
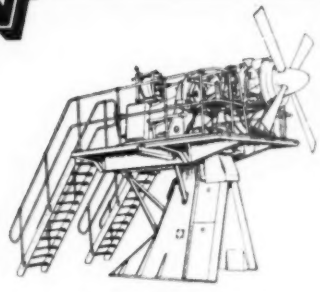
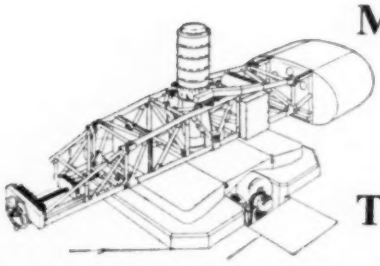


NEUTRON DIFFRACTION SPECTROMETER

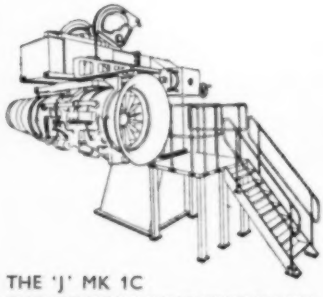


TYPE 'T' MK 2 TORQUE MEASURING TEST STAND

MANUFACTURERS OF AERO-ENGINE TEST EQUIPMENT



ACCELERATION TEST MACHINE



THE 'J' MK 1C THRUST MEASURING TEST STAND

CARDIFF

G.P.O. BOX 72 CURRAN RD. Phone CARDIFF 20641

FIRST INTO SPACE? More names recently added to the list of Soviet test pilots undergoing training for spaceflight includes that of Gennady Mikhailov, seen here in a high altitude simulation chamber. His body is wired to obtain a full range of physiological reactions, which are recorded on an oscillograph outside the chamber. An interesting feature of his apparel are fur-covered trousers.

Capturing Micro-meteorites

ALTHOUGH artificial satellites have provided rough measurements of the frequency, size and speed of micro-meteorites, composition of the latter is still not definitely known. If they reach the surface of the Earth, they cannot be distinguished from dust particles of terrestrial origin.

From White Sands, New Mexico, comes news that rocket experiments are being made to capture micro-meteorites and bring them to Earth. An Aerobee rocket has been provided with a "snap-dragon" nose which opens out into four sections when the vehicle reaches a height of about 50 miles. The "capture" device contains layers of a plastic material which will be pierced by the fast micro-meteorites travelling at six to seven miles per second, but will resist other particles.

After reaching a maximum height of 120 miles, the rocket will fall back to Earth, its nose automatically closing at the 50-mile level to preserve the specimens.

Contract for Dyna-Soar?

ONE of the big decisions being awaited by the "space fraternity" in the United States concerns the future of the Dyna-Soar project. First-phase development contracts were awarded to industrial teams headed by Martin and Boeing on a competitive basis in June, 1956, and a U.S.A.F./NASA choice between the two projects is expected to be made shortly.

The name Dyna-Soar is a contraction of the words "dynamic" and "soaring." Essentially, it means that the vehicle will use both centrifugal and aerodynamic lift forces.

Although early versions are planned to operate, unmanned, at sub-orbital speeds under remote control, in full development the vehicle is expected to be boosted to speeds approaching 18,000 m.p.h. After circling the globe, it would make a controlled re-entry into the atmosphere on an undulating trajectory, analogous to the skipping of a flat stone over the surface of a pond. The "skip" trajectory was first proposed in the Sänger-Bredt antipodal bomber project of 1937-42.

Later, the vehicle is intended to be manned and, indeed, in September, 1958, Boeing announced the names of two experimental test pilots the company had chosen to assist in the development of flight controls and other crew factors for Dyna-Soar. They added that their pilots—William C. Becker and Ralph Cokely—"may become the first persons to ride a ground-launched, hypersonic, winged vehicle into outer space and return."

Details of both the Martin and Boeing group concepts are still secret, but it is unofficially reported that weight reduction has been one of the key factors, the aim being to keep the final mass below 4,000 lb. It has also been said that the Martin Titan would be a likely choice as the booster.

Members of the Martin Dyna-Soar team were Bell Aircraft, Bendix Aviation, Minneapolis Regulator Co., Goodyear Aircraft, The American Machine and Foundry Co., and, of course, the Martin Company. Associated with Boeing were North American Aviation, Aerojet-General, Chance-Vought, The General Electric Company, Ramo-Wooldridge, Goodyear Aircraft, and the Radio Corporation of America. In addition, the full research facilities of NACA, and, subsequently, the National Aeronautics and Space Administration, were available to both groups.

In sponsoring the project, the U.S. Air Force claim that Dyna-Soar would combine the high speed of a ballistic missile with the controlled and accurate flight of a manned bomber. Lt.-Gen. Bernard A. Schriever, head of the U.S.A.F. Air Research and Development Command, said recently that the boost-glider would offer great military advantages and possibly civilian applications. He predicted that later versions of the Dyna-Soar could be made to orbit the Earth many times and re-enter the atmosphere for a specific mission. Such vehicles "would provide the crucial element of human discretion, along with almost infinite choice of flight paths," he said; "they would be less vulnerable to enemy tracking than satellites."

In addition to their value for long-range reconnaissance, the General believed they "could be used as satellite interceptors to inspect, board, disable, and possibly destroy, hostile satellites."

Whether the U.S.A.F.'s enthusiasm for Dyna-Soar as a potential weapon is shared by the Defense Department is uncertain—the project was recently reported to be threatened by a Pentagon economy drive, but that was before the advent of Luniks II and III. In the face of continuing Russian space achievement, it is difficult to see how the project could be allowed to lapse, any more than the Saturn space-booster.

Soviet Space Predictions

IN the jubilant aftermath of Lunik III, Soviet scientists seem to have outdone their American contemporaries in making predictions about the future of space travel.

Prof. Georgi Pokrovsky, writing in the magazine *Technika-Molodezhi*, says that it would be possible to set up very big scientific and even industrial structures in outer space in the form of satellites, where the gravitational pull would be non-existent. It would evidently be possible to create in this way giant telescopes, space-platforms for nuclear research, and many other types of structure. Such units, he says, could be built of flexible thin-walled tubes filled with some light gas, preferably helium. They could be boosted into space by a rocket and inflated in orbit entirely automatically.

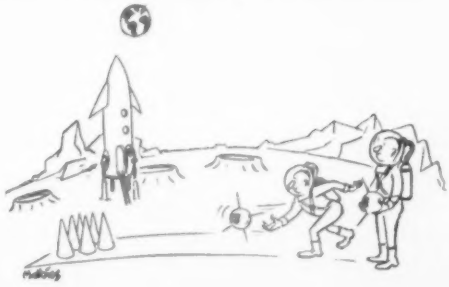
In conjunction with this type of construction, Prof. Pokrovsky says it would also be possible to apply film stretched over the tubular frame. In this way "enormous mirrors could be made to collect solar energy and use it in various engines and solar batteries."

Thin-walled, spherical, gas-filled envelopes could be conveniently used for making "powerplant Sputniks" operating on solar energy. In the same way it would be possible to build telescope or radio-telescope Sputniks, he suggests. The meteorite hazard could be overcome by using self-sealing film.

Commenting on the achievement of Lunik III in Helsinki, Prof. K. P. Stanyukovich, a member of the U.S.S.R. Inter-departmental Commission on Interplanetary Communications, said it would be 6 to 10 years before man could land on the Moon. The first man would not go until it was perfectly safe. Science had no need of suicide candidates.

One of the most important tasks of space scientists was to find places on the Moon's surface which would be safe for landing, the Professor commented. While rockets would be sent to Mars and Venus within the next two years, Russian scientists were concentrating their research on the Moon.

Prof. K. F. Ogorodnikov, of the department of astronomy, Leningrad State University, also had something to say on the subject of Lunik III and its future progeny. "The scientists and technicians who constructed this equipment," he said, "assure us that we are now able to conduct a similar operation around Mars or Venus." Asked if he believed there was life on these planets, he replied: "On Mars, unquestionably. As to Venus, my feeling is that the existence of life there cannot be ruled out. But it is certain we shall know soon."



Personal Flying

A VERY LARGE NUMBER of our post-war private and commercial pilots are familiar with Auster Autocrat G-AJEO. This light aeroplane was purchased new on May 24, 1947, some two months after the reopening of the Southend Municipal Air Centre and Flying School, since when it has been in continuous operation at the Rochford airfield.

On September 30, this veteran completed its 8,100th hour of flight, which is a truly remarkable figure for an aircraft of its type, representing an annual utilization of 675 hours for 12 years. During that time, 'JEO has been flown almost continuously on instructional flying; it has been toured all round the U.K. and the Continent, and it has even won an air race. Many commercial pilots completed their "first solos" in 'JEO, and it is possible that more students have achieved this feat in its rugged airframe than in any other school aircraft in the country.

Assuming a low average speed for its flying of 80 m.p.h., 'JEO has flown at least 648,000 miles, which accounted for the recent ceremonial inscription of an orbital path to the Moon and back "and still going strong" on the cowling of its 10th Cirrus Minor engine. Bernard Collins, well-known commandant of Southend Airport, paid tribute to his chief engineer, Mr. Jim Franks, who has been concerned with the maintenance of 'JEO throughout its long and active life.

• • •

ONE OF THE FEATURES of the recent U.S. National Business Aircraft Association convention at Minneapolis was an "Executive Suite" interior for the 600 m.p.h. Lockheed JetStar. The mobile cabin mock-up was furnished with swivel chairs which also slid back and forth and reclined; folding conference and work tables; a galley; toilet; cloakroom; and polarized windows controllable to give clear glass vision, sunglass vision, or total blackout.

The JetStar is in production at the Lockheed Marietta plant, the two prototypes having flown nearly half a million miles during flight testing and evaluation. The first production aircraft, powered by four Pratt & Whitney JT-12 jet engines on the rear fuselage, is due to fly next July. First deliveries are due in January, 1961, to orders already placed by executive operators.

Following its initial appearance, the JetStar cabin mock-up is to visit more than 100 cities throughout the U.S. and Canada.

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RECENT NEWS from Australia includes the fact that nearly 2,400,000 acres were treated by aerial agriculture operators there during 1958. A great deal of additional flying was done on dingo-baiting, although precise details are not available. Some 72,434 tons of superphosphate were dropped for top-dressing, and 482,361 lb. of seed. More than 8,000 acres were treated with insecticides and herbicides.

In all, 27,997 hours were flown on these operations. Of this total, no fewer than 17,325 were achieved with the 28-year-old biplane Tiger Moth.

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CHANCE WORKS in mysterious ways its wonders to perform. At the lively annual dinner of the Surrey and Kent Flying Club last week, the award of the various trophies was announced by chairman K. M. Freeman. To A. J. Willcocks went the Thurston Trophy for the best pupil, while John Crouch received the Sam Harris navigational trophy.

The Grece Trophy for the encouragement of flying safety went to *Popular Aviation Review* for its articles on this vital subject. Editor Mike Conry, author of these hard-hitting commentaries, which frequently criticize the official attitude to personal flying in no uncertain terms, was there to receive the trophy on behalf of his magazine.

The presentation was made by the Club's guest of honour for the evening, Mr. C. M. Colbeck, divisional controller of the southern division, Ministry of Aviation.

• • •

WHILE on the subject of the M.o.A., Mr. Duncan Sandys might like to know its dictionary definition. According to the Shorter O.E.D., a moa is a giant extinct flightless bird allied to the kiwi.

Gliding Notes

by Dr. A. E. Slater

"ASHVINI" is the name of the first two-seater sailplane to be designed in India. It is made from indigenous materials: spruce from the forests of Kulu, plywood sheets of rosewood and white cedar from Southern India, and fabric from a local cloth mill. The wings of 58 ft. span, have 4° forward sweep and 2° of dihedral. The empty weight is 700 lb., stalling speed 30 knots, minimum sink 2.7 ft./sec., and best gliding angle 1 in 23.

• • •

SOARING along the sea breeze boundary is something that this country has pioneered; in fact, to the rest of the World's glider pilots the technique of using this phenomenon seems almost entirely unknown—or, if it has been done, the news has been kept secret. A possible exception is the "smog front" at Los Angeles, which blows inland towards the mountains with a well-defined edge along which sailplane pilots have soared; it is believed to be really a sea-breeze front. Also, a well-defined sea-breeze front was used recently near Dublin. But where else outside Great Britain has this been done?

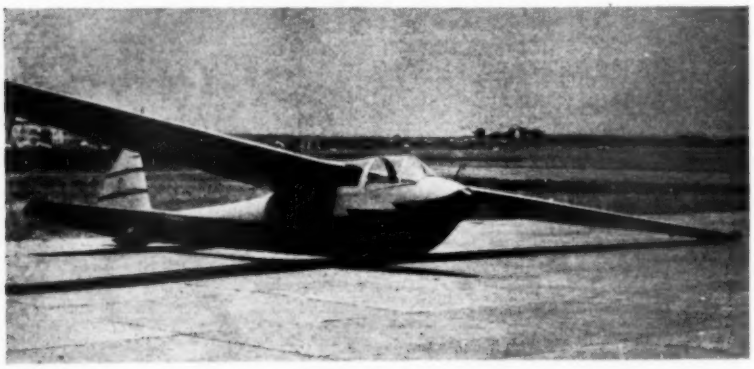
• • •

In *Weather* for September, C. E. Wallington, of the Meteorological Office, who has forecast for many gliding events, analyses two notable British flights along the sea-breeze front, both made from Lasham. The first, by J. K. Mackenzie on July 6, 1956, resulted in his describing for the first time what a well-defined sea-breeze front looks like and how it can be used; as the land air rises over the incoming sea air it drags up some of this moist sea air in the form of cloud wisps which show where the upcurrent is—one should fly just to landward of them.

Wallington draws a map of "isochrones" showing that the sea-breeze front started coming inland from the south coast before 10.00 hrs. G.M.T. and was still moving northwards after dark, for it reached Odiham and Farnborough at 20.00 hrs., and Boscombe Down and Blackbushe at 22.00 hrs.

Another such flight analysed by him was made on May 31 last year by Aylett Moore and Mrs. Ann Procter in a two-seater in almost exactly similar conditions, except that parts of the front were marked only by the edge of the sea haze rather than by cloud wisps. But this time there was an interesting aberration; Hurn had two incursions of sea breeze, one at 10.00 hrs. G.M.T. and the other, with a sharp drop in temperature and rise in humidity, just before 16.00 hrs. So there can be two sea-breeze fronts on the same day.

An important conclusion by Wallington is that the development of a sea breeze depends not so much on the difference between surface temperatures of the sea and land, as on the difference between the mean temperatures of the lowest kilometre of air on either side of the coast.



"Ashvini," an Indian-designed two-seater training sailplane made entirely of indigenous materials.

Correspondence

Successful Ultra-light Training

I HAVE recently read John Fricker's report on the Turbi, G-AOTK, in your issue of Oct. 30 last. As the chief flying instructor of the T.K. Flying Group I would like to bring the report up to date.

I have been instructing the Group for some six months now and, on Sunday Nov. 1, I sent two pupils off for their first solos, one at 5 hours' and one at 8 hours' dual. The 8 hours' pupil was delayed from going solo earlier by adverse weather. These first two solos were by David Wingate and Alan Page, both of de Havillands.

I find the Turbi easier for pupils to learn to fly than say, the Tiger or Auster, although Page and Wingate, being ex-de Havilland Technical School students, are rather more advanced than the average flying club pupil.

The Turbi is now flown solo from the rear cockpit and no extra ballasting is necessary. The new enlarged elevator trim tab gives adequate trim control and the take-off position is neutral. The fuel cock now engages in a hole when fully on. As for leather-soled shoes slipping off the rudder pedals, this is easily corrected by wearing rubber-soled shoes or flying with one's feet bare!

The only really adverse points about the Turbi as a trainer are the fixed tail-skid which necessitates using full throttle to turn when there is a strong wind and rather slow engine response, coupled with lack of power when catching a bounce on landing, with two on board.

It would be interesting to know whether any other pupils have been trained to solo standard solely on a home-made ultra-light.

Luton, Beds. B. RADLEY.

D.H.6 and Curtiss Engines

MR. BOSTOCK'S letter (Oct. 16 last) is of great interest to me as I had my first flight in 1921, in a D.H.6, operated in Newcastle by Harold Lowe, a clever local young man who even then had built several aeroplanes, some of which I saw; my friend introduced me to him in 1919 when he had just completed a side-by-side two-seater 50 h.p. Gnôme monoplane here in Benton (in which my friend said he later was a passenger when it crashed).

The flight, a longish one into a wonderful sunset, cost us two passengers in (or on) the front seat about 30s. each; we also saw the amazing Tyneside smoke-pall, the return of which we were soon to be praying for. Harold, later known as Lowe-Wylde, did not fly us as his forearm was in plaster and steel at the time, due to a prop-swinging mishap.

I distinctly remember the engine on our machine being a water-cooled V-eight, with a very small semi-circular radiator and the action of the rockers was fascinating to watch; I cannot recall whether it had stubs or two stacks now, but I don't think that it had side-pipes. It certainly was not the air-cooled engine (R.A.F. or Renault). Incidentally, your R.A.F. correspondent, Air Cdre. Smylie, puzzles me by his reference to spring-opened inlet valves; I think the OX valves were conventional, but operated by a push-pull rod and single rocker.

Is it possible that the number of the machine I flew in was G-EANJ; being only seventeen, I'm afraid I wouldn't be interested at the time? Mr. Bostock may know whether it was ever in those parts. Although I had nothing to judge by, I have since thought that our pilot must have been good; he climbed well, and kept the machine very steady.

Newcastle upon Tyne. R. A. MILNE.

Too Much Progress?

IN the leading article "The Air Fares Breakdown" in your issue of Oct. 30, you ask whether the essential reason for the failure was "the fundamental fault in the way of thinking of airlines and governments during the past decade." You then added: "Because of the difficulties of international and inter-airline fare agreement, the natural competitive urge has been channelled into the provision, at very great capital expense, of better and faster aircraft equipment."

While it is obvious that suppliers must consider the needs of their customers, surely there is a further and important factor besides the one you mention. The airlines, being in a highly competitive international business, must be influenced by the future projects which the aircraft manufacturing industries of the World—themselves likewise in a vigorously competitive situation—keep offering to the operators.

It seems to me so often that no sooner does an airline settle for a fleet of new and costly aircraft, designed, it is hoped, to meet its requirements for, say, up to 10 years, than manufacturers announce their intention to produce still "better and faster aircraft equipment," with improved economics and other attractions. Even now, when airlines have vast orders for subsonic airliners, they are faced with the prospect of the emergence of supersonic civil aircraft, which may almost be available indeed before some new fleets at present on order or contemplated have hardly had time to go into service! And if one big airline buys supersonic transports, then the others will be wanting them, too, if they are to survive in a competitive trade.

Nobody would wish to stop progress—but manufacturers as well as airlines and governments, I suggest, are involved in any "fundamental fault" there may have been.

London, S.W.1. "A FARE PAYER."

Bernt Balchen's Book

I HOPE my good friend Chris Wren will forgive me if I take the liberty of correcting an error in his excellent review of "Come North with Me," page 298, Oct. 2 issue.

When Balchen and Richard Byrd flew over the South Pole in November, 1929, they used the famous Ford Trimotor "Floyd Bennett," not a Fokker Trimotor as stated by your contributor. There were two other aircraft used on Byrd's Antarctic Expedition, a single-engined Fokker Super-Universal and a small Fairchild, but only the Ford made the first flight over the South Pole.

Both the original Fokker Trimotor F.VII/3m "Josephine Ford," which made the first *aeroplane* flight over the North Pole on May 9, 1926, and the Ford Trimotor used on the South Pole flight, have been kept. They are exhibited at the Henry Ford Museum at Dearborn, near Detroit.

Probably few people in Britain are aware that nine years ago another excellent book on Bernt Balchen's life story was published in the U.S.A., but there was no British edition. This was "Hitch Your Wagon," by Clayton Knight and Robert Durham. In some respects, I think this earlier book is superior to the one recently published. Others who have read both books will perhaps disagree.

Nairobi, Kenya. DENNIS M. POWELL.

Wroundabout

Shame. A little joke against ourselves. A friend who works at Fokker's Schiphol factory writes rather sadly to point out that their copy of this magazine arrives addressed to "Fokker Wolffe Aircraft, Ltd." He pictures the ghost of Anthony in one of his famous aircraft making a phantom bombing run down Bowling Green Lane and dropping a stick of spectral Amstel bottles on these offices. Friendship demands correction. Note passed to our addressing department.

*

Ghosts and Angels. Speaking of manifestations, this strange, solitary figure, carrying a battered case, aroused speculation at Biggin Hill Battle of Britain Display. Maybe an ex-wartime pilot fallen on bad times?—or the ghost of one, making an annual pilgrimage? I wondered vaguely if he was connected with that London shop named "The Angel Employment Agency." Who would employ *angels*? And what *for*? Anything to do with those wartime "Angels One-Five"? Alas, it is so-called because it is in the Angel district. But I still have the Bandit of Biggin to ponder on.

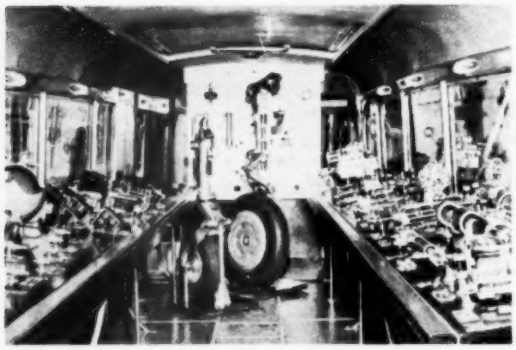
*

Write Your Own Column. If you were told that an Eagle DC-6C on a Nairobi charter was diverted to Rome for a passenger to be delivered of a baby, what bright remark would leap to your nimble mind? Something about this being an exception to the rule that babies are delivered by Stork—this one came by Eagle? I thought so. Oh, well.

STOP PRESS! Antipodean instalment of Wren's Wroundabout from New Zealand will be found on page 458.

by Wren

NOTES AND EVENTS



INSTRUCTIONAL SHOWROOM.— This Dowty mobile instructional school is at present in Interlaken where a course on Dowty products used in Hunters is being given to Swiss Air Force technicians.

FUEL GAUGE ORDER.—Pacitor electronic fuel gauges, manufactured by Firth Cleveland Instruments, Ltd., have been ordered for the Armstrong Whitworth 650 Argosy transport. These gauges are already in service in the Britannia, Beverley, Vanguard, Herald and many other aircraft.

FREIGHT NETS.—Thomas French and Sons, Ltd., Manchester, has developed a new type of web construction for use in freight netting. The nets are built up of woven nylon webbing, slotted at intervals, to permit the interposition of transverse lengths of webbing; the slots are integrally woven into the material.

GOLD-FILM GLASS.—The Triplex Safety Glass Co. is to produce gold-film windscreen glass of a greater curvature than has previously been possible. This is particularly useful for high-speed aircraft, in which windscreen shape is especially important.

ALUMINIUM TO STEEL.—Solar Aircraft Co., Ltd., has developed a method of brazing aluminium to stainless steel. It is claimed that tests have shown that the system affords good strength characteristics and that brittleness is not a problem.

LIGHTING CONTRACT.—G.E.C. is to supply a new airfield lighting system for the Coolidge Airport, Antigua. The order, which includes equipment for runway, approach and taxiway lights, cable and switchgear, is worth about £6.000. Operators using the airport include P.A.W.A. and T.C.A.

X-RAY EXAMINATION.—Research and Control Instruments, Ltd., distributors of Muller Industrial X-ray equipment, has recently used this apparatus to examine the wheelcase suspension assembly of B.O.A.C. Comet Avon engines. This work, done in collaboration with the Corporation's Non-Destructive Testing Unit at London Airport, showed that such examinations may be made with the engines in position.

TOO COLD.—Monsanto Chemicals, Ltd., have pointed out that the low limit of the temperature range for their new cooling fluid for electronic equipment is −65° F. and not the −650° F. inadvertently given in our notes on page 398 of THE AEROPLANE AND ASTRONAUTICS for October 23.

Company Notices

NEW COMPANIES

Microcell Engineering, Ltd. (639,571).—Private co. Reg. October 14. Cap. £1,000 in £1 shs. Objects: To carry on the business of manufacturers of and dealers in seats and other equipment required in aircraft or other transport vehicles. Directors: Henry Kremer, 36 Winnington Road, N.2; William E. Fairbrother, 74 Belmont Hill, S.E.13. Sec.: W. E. Fairbrother. Reg. office: 9 Kingsway, W.C.2.

Lloyd Lewis, Ltd. (638,394).—Private co. Reg. September 30. Cap. £1,000 in £1 shs. Objects: To carry on the business of hirers, charterers and operators of aeroplanes or other aerial conveyances, air chartering, shipping, forwarding and transport agents, etc. Directors: Frank Lloyd, 6 Govett Avenue, Shepperton, Middlesex; Charles B. L. Lewis, Central Hotel, Widnes, Lancs. Sec.: W. A. Watford. Reg. office: 122-4 High Street, Staines, Middlesex.

New Patents

APPLICATIONS ACCEPTED

825,957.—Soc. Bertin et Cie.—Devices for increasing or augmenting the momentum of a fluid especially applicable as a lifting or propulsion device.—Nov. 29, 1956. (Nov. 29, 1955, and May 3, 1956.)

825,708.—Recherches Etudes Production R.E.P.—Landing gear for aircraft.—April 19, 1956. (June 23, 1955.)

825,941.—Pallavicino, C.—System for speeding up the take-off of aircraft on runways.—Feb. 27, 1956. (Feb. 26, 1955.)

825,997.—Recherches Etudes Production R.E.P.—Undercarriages for aircraft.—Nov. 21, 1957. (Nov. 22, 1956.)

826,043.—Minister of Supply.—Parachutes.—Dec. 19, 1957. (Sep. 21, 1956.)

Applications open to public inspection on Dec. 23, 1959; opposition period expires on March 23, 1960.

Aviation Calendar

November 16.—R.Ae.S. Henlow Branch lecture, "Flight Development of a Modern Prototype Aircraft," by C. F. Bethwaite, in Building 62, R.A.F. Technical College, **Henlow,** at 19.45 hrs.

November 17.—R.Ae.S. Christchurch, lecture by Maurice Brennan at the King's Arms Hotel, **Christchurch,** at 19.30 hrs.

November 17. — R.Ae.S. lecture, "Magneto-Gasdynamics," by Dr. J. A. Shercliff, at the Library, 4 Hamilton Place, **London,** W.1.

November 17. — R.Ae.S. Gloucester Branch lecture, "Prospects of Space Flight in the Commonwealth," by J. E. Allen at Wheatstone Hall, Brunswick Road, **Gloucester,** at 19.30 hrs.

November 18. — R.Ae.S. Weybridge Branch lecture, "Flight Testing in Supersonic Speeds," by Wg. Cdr. R. P. Beamont, at the Apprentice Training School, Vickers-Armstrongs, **Weybridge,** at 18.10 hrs.

November 18.—R.Ae.S. Preston Branch lecture, "Aircraft Production Techniques," by L. G. Burnard, at the R.A.F.A. Hall, **Preston,** at 19.30 hrs.

November 18.—The Kronfeld Club, Shell Film, "Flyhook" and "Transonic Flight," at 56 Victoria Street, Westminster, **London,** S.W.1.

November 18.—Guild of Air Pilots and Air Navigators Annual Service at St. Michael's, Cornhill, at 17.00 hrs., followed by Annual General Meeting at Innholders' Hall, College Street, **London,** E.C.4, at 18.30 hrs.

November 18.—R.Ae.S. Coventry Branch lecture, "General Aircraft Electrical Systems," by G. G. Wakefield, at the Herbert Art Gallery, **Coventry,** at 19.30 hrs.

November 18.—R.Ae.S. Southampton Branch, "Supersonic Propulsion," by Dr. R. R. Jamison at the Engineering Lecture Theatre, **University of Southampton,** at 20.00 hrs.

November 19.—R.Ae.S. Fifteenth British Commonwealth lecture, "Some Recent Progress in Air Survey with Particular Reference to Newly Developed Territories," by W. P. Smith at the Institute of Mechanical Engineers, 1 Birdcage Walk, **London,** S.W.1, at 18.00 hrs.

November 20.—Institute of Navigation lecture, "Radiometry, Radio-Astronomy and Infra-red Techniques," by C. M. Cade, at the Royal Geographical Society, 1 Kensington Gore, **London,** S.W.7, at 17.15 hrs.

Personal Notices

BIRTHS

Abbott.—On November 1, at Bracknell, Berks, to Joyce (*née* Ayling), wife of Flt. Lt. J. W. Abbott, R.A.F.—a daughter (Jacqueline).

Aston.—On October 28, at 37 Mount Hermon Road, Woking, to Helen, wife of Bill Aston—a daughter.

Barraclough.—On October 29, at George A.F.B. Hospital, California, to Margaret (*née* Urquhart), wife of Flt. Lt. R. H. Barraclough, R.A.F.—a daughter (Tessa Louise).

Bever.—On September 23, in Singapore, to Trintje Carroll (*née* Rollinson), wife of Flt. Lt. J. H. M. Bever, R.A.F.—a son.

Collyer.—On October 27, to Ruth, wife of Flt. Lt. J. T. Collyer, R.A.F.—a son.

Harvey.—On October 29, at St. Andrews, to Maureen (*née* Coles), wife of Flt. Lt. M. Harvey—a son.

Little.—On October 25, at R.A.F. Hospital, Ely, to Gwen (*née* Smiles), wife of Flt. Lt. A. S. Little, R.A.F.—a son (Nicholas Anthony).

Maitland.—On October 25, at Crockham Grange, Crockham Hill, Kent, to Nan (*née* Findlay), wife of Sqn. Ldr. J. R. Maitland—a daughter.

Morrell.—On October 25, to Pamela, wife of Flt. Lt. R. Morrell, R.A.F.—a son.

Penman.—On October 26, at Epsom District Hospital, Surrey, to Anne (*née* Rolland), wife of M. Penman (R.A.F., retd.)—a daughter.

BOOKS RECEIVED

PIONEERS OF PETROL.—A centenary history of Carless, Capel and Leonard, by Edward Liveing. 95 pp., 8¼ in. by 5¼ in. Illustrated. H. F. and G. Witherby. Price 42s.

FIVE DOWN AND GLORY.—A history of American air aces. By Gene Gurney. 302 pp., 8¼ in. by 5¼ in. Illustrated. Putnam and Co., Ltd. Price 25s.

THE HURRICANE STORY.—The "biography" of the Hawker Hurricane. By Paul Gallico. 144 pp., 7¼ in. by 4¼ in. Illustrated. Michael Joseph, Ltd. Price 12s. 6d.

SPACE TECHNOLOGY.—Based on a series of lectures given by the Department of Engineering and Physical Sciences, University of California, in co-operation with Space Technology Laboratories, Inc. 1,151 pp., 9 in. by 5¼ in. Illustrated. John Wiley and Sons, Inc. Price 180s.

THE CONQUEST OF THE AIR.—History of aeronautical science, for children. Translated from the French by Michael Heron. 85 pp., 11¼ in. by 10 in. Illustrated in colour. Burke Publishing Co., Ltd. Price 15s.

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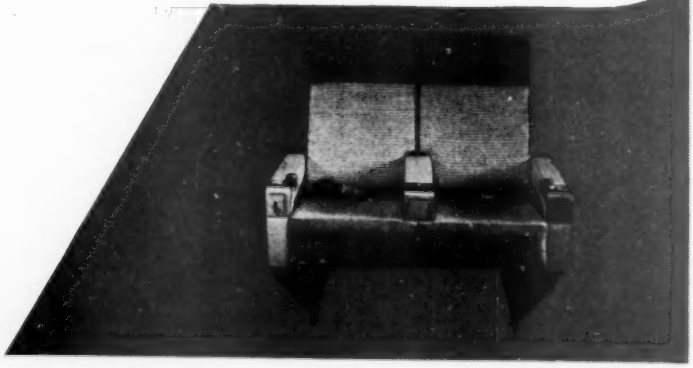

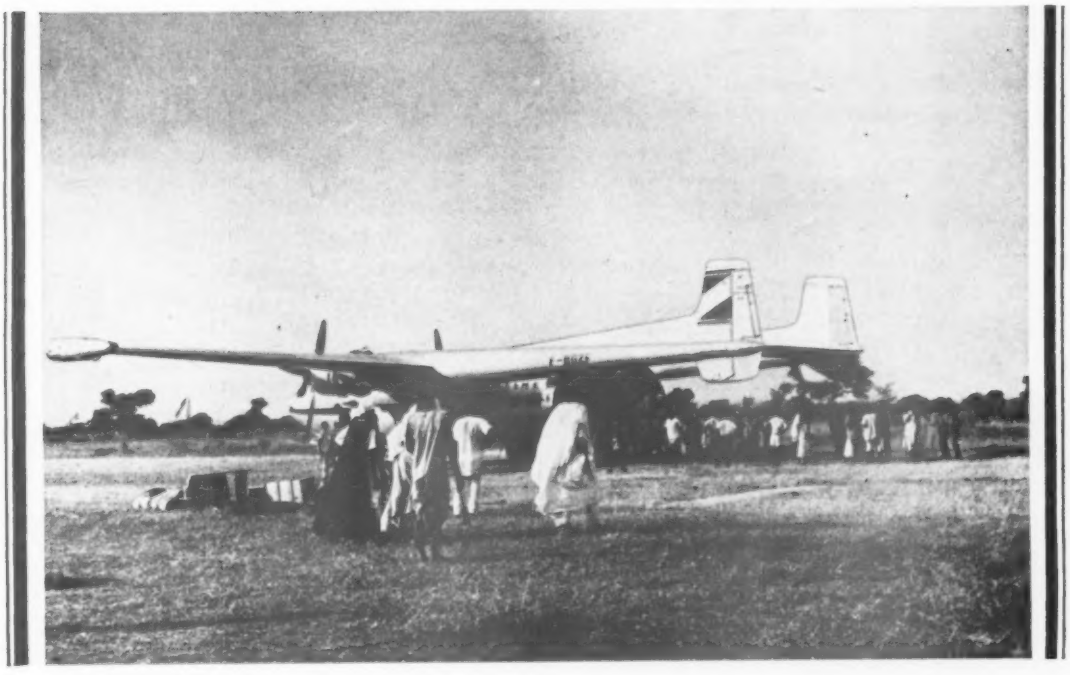

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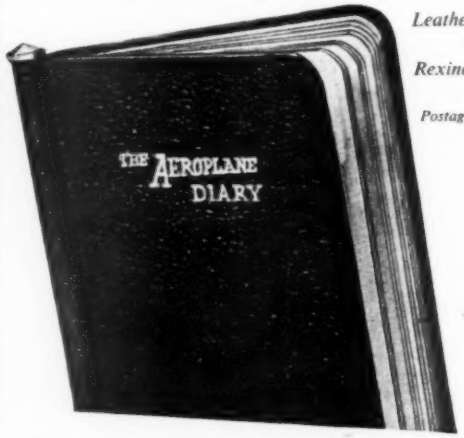

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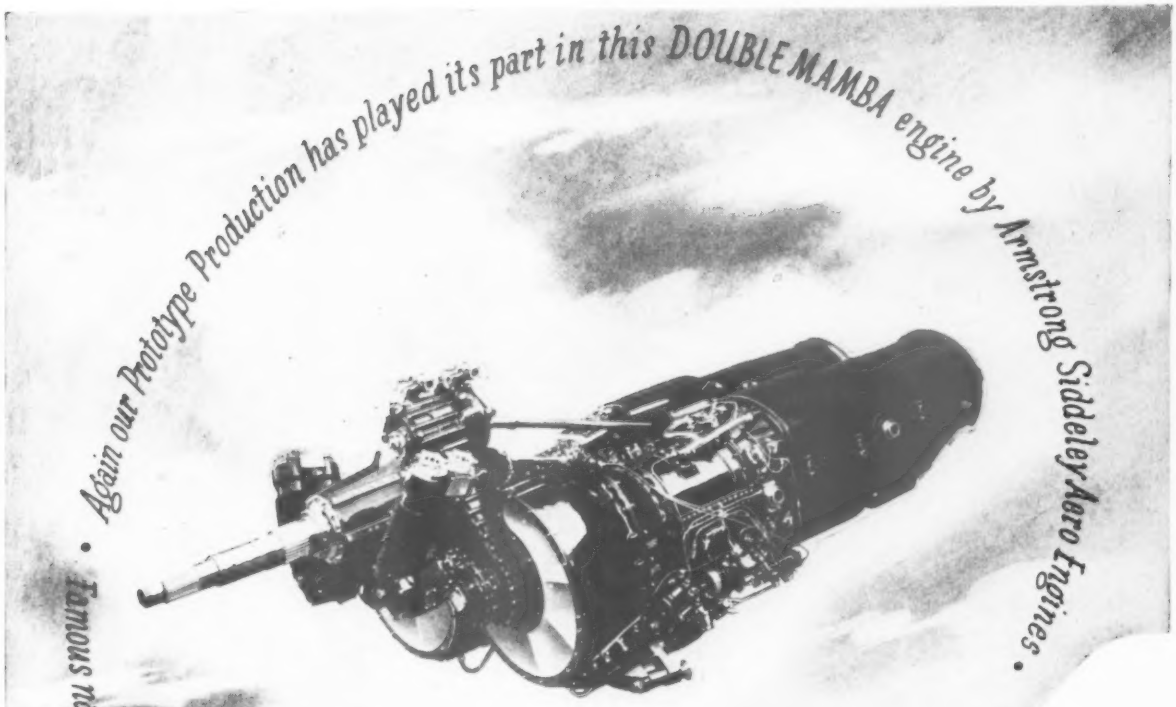
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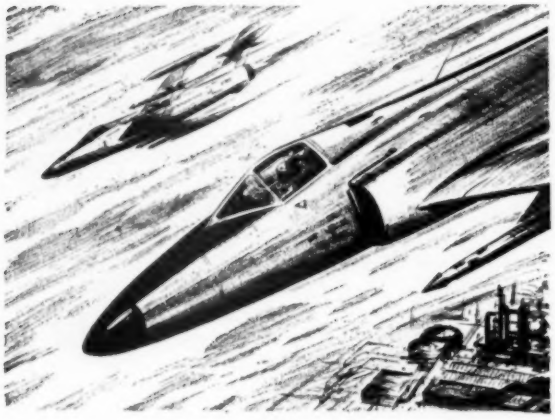

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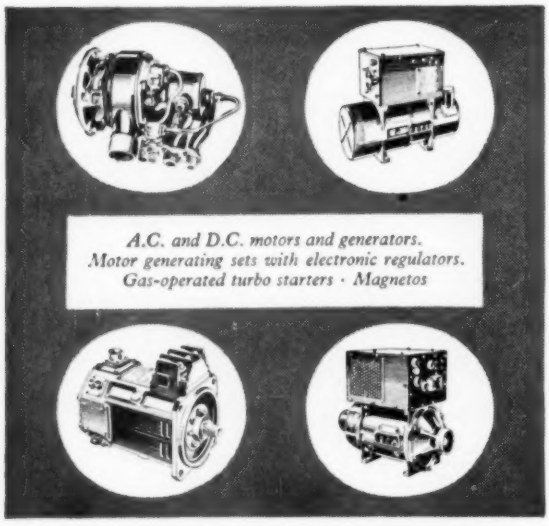
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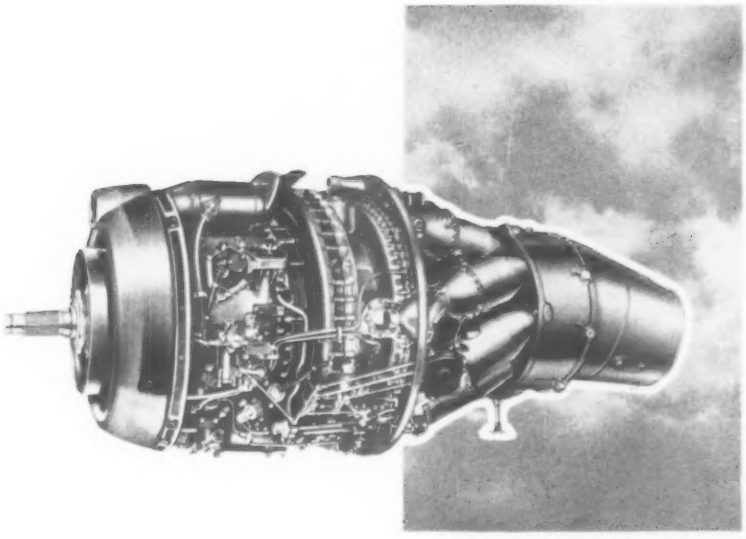

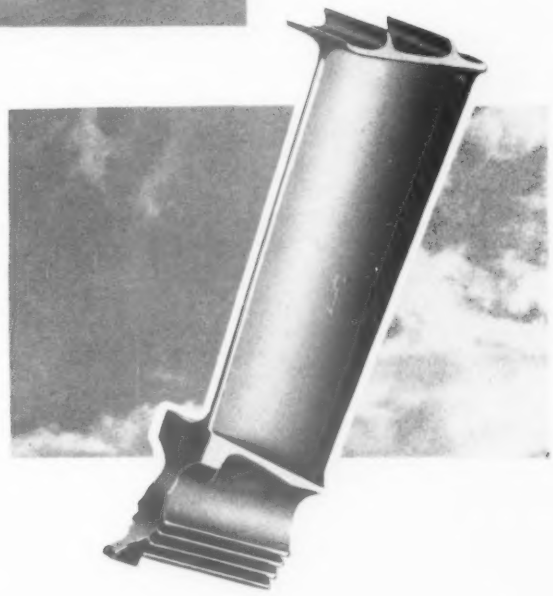

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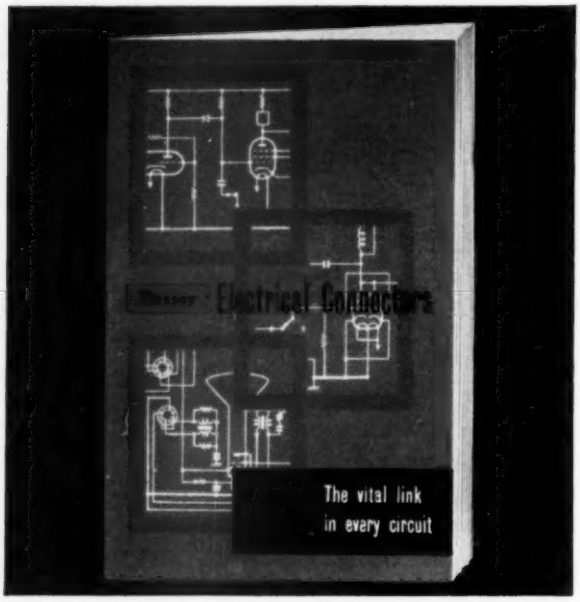

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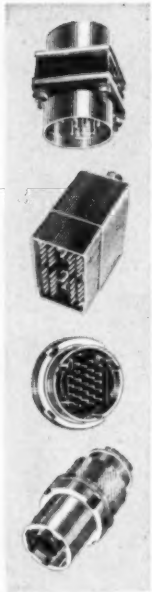

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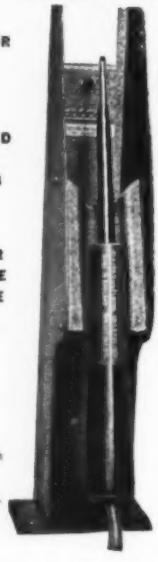

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NOTICES

AIR TRANSPORT ADVISORY COUNCIL

THE AIR TRANSPORT ADVISORY COUNCIL give notice that they have received the undermentioned applications to operate scheduled air services:—

FROM EAGLE AIRWAYS, LTD., OF 40 EDGWARE ROAD, LONDON, W.2:—

APPLICATION NO. 3276 for a seasonal Normal Scheduled Service with DC6, DC6C and Viscount aircraft, for the carriage of passengers supplementary freight and mail on the route London (Blackbushe) or London Airport-Lyons (Optional Technical)-Brindisi, at an initial frequency of three return flights weekly increasing later to one return flight daily, from May to October each year, for 10 years from date of approval.

FROM BRITISH OVERSEAS AIRWAYS CORPORATION OF LONDON AIRPORT, HOUNSLOW, MIDDLESEX:—

APPLICATION NO. 3271 for permission to include an optional traffic stop at Sao Paulo from January, 1960, on their Reserved Route No. 28 London-Madrid - Lisbon - Casablanca - Dakar - Recife - Rio de Janeiro - Montevideo - Buenos Aires and/or Santiago.

FROM BRITISH EUROPEAN AIRWAYS OF BEALINE HOUSE, RUISLIP, MIDDLESEX:—

APPLICATION NO. 165/1 for an amendment to the terms of approval of the Normal Scheduled Service which they are authorized to operate until September 30, 1959 with DC-3 Pionair, Viscount, Ambassador or Viking aircraft, on the route London-Bordeaux (opt.)-Biarritz at a frequency of seven return flights weekly during the summer season each year, so as to permit them to operate the service until September 30, 1969, on the amended route London-Bordeaux and/or Biarritz at a frequency in accordance with traffic demand throughout the year, and to use Vanguard, Comet and D.H. 121 aircraft in addition to the types previously approved.

FROM EAST ANGLIAN FLYING SERVICES, LTD., OF SOUTHEND AIRPORT, ESSEX:—

APPLICATION NO. 546/5 for permission to operate at an increased frequency of 20 return flights weekly, and with Dakota aircraft in addition to the Dove and D.H. 89 aircraft which they are at present authorized to operate on the U.K. Internal Service on the route Portsmouth-Guernsey (opt.)-Jersey, at a frequency of 12 return flights weekly, until September 30, 1966.

These applications will be considered by the Council under the Terms of Reference issued to them by the Minister of Civil Aviation on July 30, 1952. Any representations or objections with regard to these applications must be made in writing stating the reasons and must reach the Council within 14 days of the date of this advertisement, addressed to the Secretary, Air Transport Advisory Council, 3 Dean's Yard, London, S.W.1, from whom further details of the applications may be obtained. When an objection is made to an application by another air transport company on the grounds that they are applying to operate the route or part of route in question, their application, if not already submitted to the Council, should reach them within the period allowed for the making of representations or objections. 508-7

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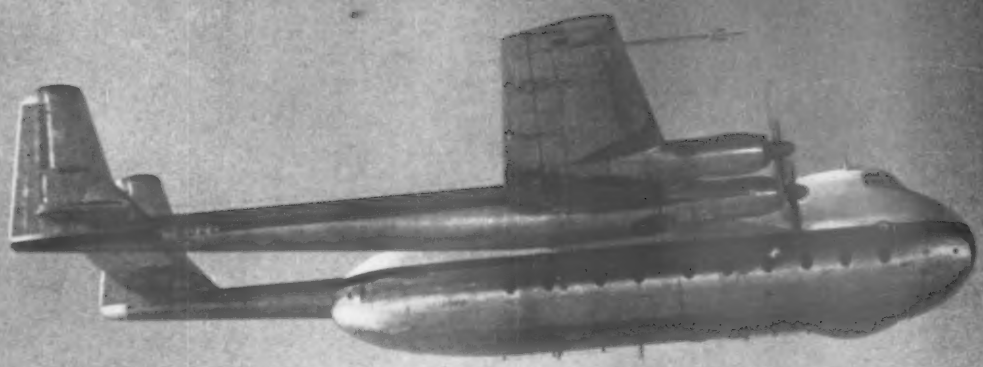

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